Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

In this issue—

- Myxosporidia in Fish — P. 1
- Bacteriology of Fillets — P. 3
- Variable Pitch Propellers — P. 3
- Smoked Eels — P. 11
- Specifications for Fish — P. 19

— and 35 others

MAR 1956
LIBRARY
POFI
FISH & WILDLIFE SERVICE

Vol. 9 No. 2 February 1956

Fish and Wildlife Service
U. S. Department of the Interior
Washington D. C.

UNITED STATES
DEPARTMENT OF THE INTERIOR

DOUGLAS McKAY, Secretary

FISH AND WILDLIFE SERVICE

JOHN L. FARLEY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

EDITORS

A. W. ANDERSON, Chief, Branch of Commercial Fisheries

DONALD Y. ASKA, Chief, Educational and Market Development Section

ASSOCIATE EDITOR

MAURICE E. STANSBY, Chief, Pacific Coast and Alaska Technological Research

ASSISTANT EDITORS

KATHRYN L. OSTERHAUG, Fishery Products Technologist, Seattle

F. BRUCE SANFORD, Chemist, Seattle

Applications for COMMERCIAL FISHERIES ABSTRACTS, which is mailed free to members of the fishery industries and allied interests, should be addressed to the Director, Fish and Wildlife Service, United States Department of the Interior, Washington, 25, D.C.

Fulfillment of foreign requests confined to Government agencies, research institutions, and libraries.

The Service assumes no responsibility for the accuracy of material from outside sources, and can fulfill requests for copies of the articles only if the abstract was taken from a Service publication. Readers should direct requests for other articles to the author of the article or to the publication in which it appeared. The addresses of these publications are available from the Fish and Wildlife Service, Washington 25, D. C., and will be sent to inquirers upon request.

The abstracts in this leaflet may be left in their present form; but it is suggested that to make the most efficient use of them, they be cut out on the lines designated and filed by the number in the upper left-hand corner of each. For a full description of this filing system see "Fishery Technological Abstract Card System" by Maurice E. Stansby and K. L. Osterhaug, Fishery Leaflet No. 232, obtainable free by request from Fish and Wildlife Service, Washington 25, D. C.

In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
2	Fresh fish	7	Analytical Methods
3	Preserved fish	8	Composition
4	Oils	9	Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1953

0.32 ON THE MECHANISM OF HISTAMINE FORMATION

Geiger, E. (Van Camp Laboratories, Terminal Island, California)
Archives of Biochemistry 17, 391-395 (June 1948)

In a study of the mechanism of histamine formation in animal tissue, the author investigated enzymatic decarboxylation of two histidine-containing peptides: namely, aspartyl-histidine, containing histidine with a free carboxyl group; and histidyl-histidine, with both a free carboxyl and a free amino group on the histidine residues.

Methods. --Three methods for decarboxylation were attempted: first, with an enzyme preparation derived from Clostridium welchii; second, with a strain of E. coli isolated from human feces; and third, with marine bacteria isolated from ocean-fresh Pacific pilchards. Control experiments have shown that both the marine bacteria and the coli are very effective in histamine formation from histidine. Histamine formation was assayed by response of (1) an isolated guinea pig-ileum and (2) blood pressure change after i.v. injection into nembutalized cats.

Results. --No free histamine was formed in any of the experiments where the peptides were incubated with the bacteria or with the enzyme preparation, whereas parallel control samples using L-(--)-histidine as a substrate showed considerable histamine formation. In the light of a recent claim that racemization of histidine occurs during the preparation of histidyl-histidine, the extent to which the histidine unit in the peptides was susceptible to enzymatic decarboxylation was investigated. Samples of histidyl- and aspartyl-histidine were hydrolyzed with normal H_2SO_4 for 4 hours in a boiling water bath. The acid was then removed with $Ba(OH)_2$ and finally concentrated in vacuo to 10 milliliters. These hydrolyzates were then incubated with the bacteria and enzyme preparations. In all cases considerable quantities of histamine were produced. Table 1, over, indicates that significant quantities of L-(--)-histidine groups were present in the original peptides, and that their decarboxylation has been prevented by the peptide linkages. To establish conditions closer to those under which bacteria

(over)

 ABSTRACTER: Martin Heerdt

0.5 ON THE TWO NEW MYXOSPORIDIA (CHLOROMYXUM MUSCULOLIQUEFACIENS) AND (NEOCHLOROMYXUM CRUCIFORMUM) FROM THE JELLIED MUSCLE OF SWORDFISH (XIPHIAS GLADIUS) AND COMMON JAPANESE SEA BASS (LATEOBRAX JAPONICUS)

Matsumoto, Koichi (Tokyo-to Laboratories for Medical Sciences)
Bulletin of the Japanese Society of Scientific Fisheries 20, 469-479 (October 1954) (In English)

Spores of a Myxosporidian parasite were found in the jellied muscle of a swordfish landed at Kesennuma, Japan in 1953. Myxosporidian spores of a different shape were found in the jellied muscle of two common Japanese sea bass caught in Ibaragi Prefecture in 1953-54. This paper describes what are believed to be two new Myxosporidia.

The swordfish, which weighed 227 pounds, was caught in the period July 15-17, 1953 about 30 miles off Kamaishi, and unloaded on July 22, 1953. Externally, the fish was fresh but less elastic than normal to touch; internally, it was sufficiently cold to indicate adequate refrigeration in transit. When cut, it was discovered that all of the trunk muscle tissue had become liquefied. The odor of the fish was normal. Muscle tissue cut from the dorsal portion of another slightly infected swordfish showed honeycomb infection that is believed to be the initial stage of the jellied condition. Whether liquefaction occurs prior to the death of the fish is not known.

Nemeczek's hanging drop preparations made from both honeycombed and liquefied swordfish muscle tissue were examined under a microscope. Spores of Chloromyxum musculoliquefaciens were observed within the muscle fibers of materials. The spore is slightly compressed parallel to the longitudinal plane like a mandarin orange and formed from two subspherical shell valves, figure 1. Four slight, equidistantly-spaced grooves extend from the anterior to the posterior end of the spore. Four spherical to ovoid polar capsules appear at the anterior end of the spore. The fresh spore measures 5.3 to 7.3 microns in diameter at the suture, 7.4 to 9.9 microns at the greatest diameter, and 7.0 to 9.0 microns thick.

(over)

 ABSTRACTER: Martin Heerdt

1.85 CONVENIENCE, MENU VERSATILITY SPUR GROWTH OF PEELED AND DEVEINED SHRIMP

Anonymous
Quick Frozen Foods 18, 91 (September 1955)

Peeled and deveined shrimp is an addition to the growing line of convenience foods. A number of packers have recently added this item to their line. Some of those who have it already established report that peeled and deveined shrimp is even outrunning the very popular breaded shrimp.

Recently, one company introduced a vacuum pack of cooked, peeled, and deveined shrimp and another brought out a new convenience package -- peeled and deveined shrimp that may be cooked in their own foil bag. A third company has made available peeled and deveined shrimp in a new 8-ounce poly bag as well as a custom pack consisting of a 2 1/2-pound package holding five 8-ounce bags.

Convenience and menu versatility are the major talking points for peeled and deveined shrimp. Although often promoted as an appetizer, these shrimp are building an increasing share of their success on a broad use appeal.

The higher price per pound the homemaker pays for the fully cleaned product is more than offset by the increase in edible contents of the package.

 ABSTRACTER: Kathryn L. Osterhaug

1.81 PROPOSED CHANGES IN PUBLIC HEALTH SERVICE SHELLFISH SANITATION MANUAL

Jensen, Eugene T. (U. S. Public Health Service)
Southern Fisherman 15, 24, 49 (October 1955)

The former Public Health Service Shellfish Sanitation Manual is incomplete, outdated and difficult to use. The new manual corrects the deficiencies, drops obsolete requirements and makes the manual easier to use. Although most of the problems are in growing area control, the new manual is concerned only with sanitation in harvesting and processing operations.

Two sanitation problems are involved on harvesting boats: (1) the sanitary handling of shellfish aboard the boat and (2) sewage disposal.

Shellfish may be contaminated during harvesting by unsanitary practices such as leaving the shellfish on deck in contact with contaminated water.

Particularly during the harvesting of shellfish the water must be free from contamination. A few details of the plan to keep the oyster growing areas pure has met with the fishermen's resistance.

Muddy shellstock is a primary cause of unclean processing plants. There is evidence that the bacteria contained in the mud may be responsible for the high bacteria count in the shucked oysters. The primary responsibility for washing the shellstock lies with the harvestor, but this is not a hard and fast rule.

(over)

 ABSTRACTER: Lois Elgin

HISTAMINE FORMATION MECHANISM

MYXOSPORIDIA IN FISH

PEELED AND DEVEINED SHRIMP

SHELLFISH SANITATION

0.5

Two common Japanese sea bass, 40 to 45 centimeters in length and caught in Ibaragi Prefecture in December 1953 and January 1954, were found to have honeycombed and slightly jellied trunk muscle. Spores of Neochloromyxum cruciformum were found in the jellied muscle tissue that was examined under a microscope. These spores were quadri-cuspidated asterisks flattened parallel to the longitudinal plane, figure 2a. Each spore appears to be composed of four laterally expanded conical shell valves, attached divergently at the base. Four elongated ovoid polar capsules (one in each cone) appear at the anterior end. A straight sutural line divides the asterisk into two shell valves each with two cones. The maximum diversion (breadth) as shown in figure 2a varies from 13.6 to 16.8 microns.

a) Anterior view

b) Side view

Figure 1. Spores of Chloromyxum musculoliquefaciens sp. nov.

a) Anterior view

Figure 2. Spores of Neochloromyxum cruciformum gen. et sp. nov.

1.81 (Cross Reference: 2.3)

There are many problems in the processing operation. Screening of packing room windows, which is necessary for fly control, has been a certification requirement for years. The plant lighting requirements have been increased. The handwashing facilities are no guarantee of sanitation; the employees must actually use them.

Sanitary construction of returnable containers has been troublesome. Provision must be made for cooling the product and cleaning the container.

Surveys have shown that the shucking room procedures need to be revised. To avoid bringing a vast amount of mud and dirt into the plant, shellstock washing will be required. It is difficult to enforce the practice of changing the water in dip buckets frequently enough to avoid high bacteria counts. As a result, dip buckets have been prohibited. Several new requirements will reduce the time interval between shucking and refrigeration. The new manual also proposes that each single service container be given a bactericidal rinse before filling.

A major change has been made in refrigeration requirements during repacking. The revised manual will require that repacking be accomplished so that the internal temperature of the shellfish does not exceed 50° F. or that the packing room be refrigerated to 50° F. or less.

0.32 (Cross Reference: 2.9)

normally attack proteins, the experiments were repeated incubating the peptides with the bacteria at the slightly alkaline pH of 7.2. No histamine was produced, indicating that the histidine in peptide linkage withstands enzymatic decarboxylation in alkaline as well as acid media.

An investigation to learn if some of the histamine produced by bacterial action on protein is present in the form of peptides was made. Since histamine substituted in the amino group shows no biological activity, but can be restored to an active form by acid hydrolysis, it was assumed that, if some significant part of the histamine formed were present in peptide linkage, a difference in the assay should be apparent between samples taken before and after acid hydrolysis.

Table 2 presents the data obtained and indicates that acid hydrolysis did not increase the histamine content of the incubated samples. The biologically determined histamine concentrations are the same within the limits of experimental error. These results indicate that none of the histamine produced by bacterial action on protein was present in the peptide form.

Table 1
Histamine Production from Acid-Hydrolyzed Peptides

Substrate	Incubated with	Mg. histamine produced
50 mg. Acid-hydrolyzed histidyl-histidine	*E. coli*	22.4
	Marine bacteria	21.6
	Enzyme preparation	18.5
50 mg. Acid-hydrolyzed aspartyl-histidine	*E. coli*	11.5
	Marine bacteria	14.6
	Enzyme preparation	9.4

Table 2
Histamine Production from Protein
(Mg. histamine/100 g. protein)

Protein	After incubation			Incubated with
	Before incubation after acid hydrolysis	Determined directly	After acid hydrolysis	
Casein	>0.1	45	Same	*E. coli*
Fish protein	>0.02	76	Same	*E. coli*
		120	Same	Marine bacteria
Rabbit muscle	>0.01	53	Same	*E. coli*
Rabbit liver	>0.07	45	Same	*E. coli*

1.85 (Cross Reference: 3.230)

2.01 THE EFFECTS OF ICED AND FROZEN STORAGE UPON THE TRIMETHYLAMINE CONTENT OF FLOUNDER (PAROPHYRS VETULUS) MUSCLE

Good, Charlie M. and Stern, Joseph A. (School of Fisheries, University of Washington, Seattle, Washington)
Food Technology 9, 327 (July 1955)

English sole (Parophyrs vetulus) were held in iced storage for periods ranging from 0 to 15 days. At intervals during this period samples were removed from the ice and filleted. Fillets were packaged, frozen, and held in frozen storage at 0° F. for periods up to 24 weeks. Samples were subjected to various spoilage tests prior to freezing and at intervals during the period of frozen storage. Of the various tests investigated, only the determination of trimethylamine was found to be of value in estimating the quality of English sole prior to freezing. The trimethylamine content of the fillets did not change during frozen storage, and it was concluded that the test could be used, after frozen storage, to indicate the quality of the flesh at the time it was frozen.

See figures 1 and 2, over.

(over)

Authors' summary

2.01 SPOILAGE PROBLEMS IN FRESH FISH PRODUCTION. CHAPTER IV -- BACTERIOLOGICAL PROBLEMS IN THE PRODUCTION OF FISH FILLETS

Castell, C. H. (Atlantic Fisheries Experimental Station, Halifax, Nova Scotia)
Fisheries Research Board of Canada, Bulletin No. 100, 16-31 (1954)

The effect of round fish quality on the keeping time of the fillets. --Spoilage begins as soon as the fish dies. Storing the fish in ice is simply a means of retarding the rate of spoilage until the fish can be marketed. The extent of the spoilage changes that have already occurred in the whole fish before it can be filleted will affect the time that it can be stored in the form of fillets before bad odors develop.

Fillet contamination during processing. --Fish carry large numbers of spoilage bacteria in their surface slime and in their viscera. Slime and viscera become smeared over tables, belts, conveyors, knives, and even the cutter's hands in a fillet plant. During the process of cutting, skinning, transporting, and wrapping the fillets, large numbers of bacteria are transferred to the surface of the freshly cut fillets.

Increased keeping time by reduction in numbers of bacteria. --Fillets that were cut under aseptic conditions and kept in sterile containers were stored with commercial fillets at 38° F. After 6 days the commercial fillets had spoilage odors and after 9 days they were completely spoiled. One of the aseptic fillets in contrast, developed a slight fishy odor after 19 days and became badly spoiled after 24 days at which time a second aseptic fillet had become sour. The remaining four aseptic fillets were still fresh after 40 days.

Fillet contamination. --Ninety percent of the bacteria on the fillets were picked up on the fillet cutting board after the fillet was skinned. Even when the fish cutting surface is sterile at the start of

(over)

ABSTRACTER: Martin Heerdt

2.1123 TECHNIQUE OF SNAG-LINE FISHING

Wallace, Walker D.
Fishing Gazette 72, 40 (September 1955)

Snag-line fishing in the southern United States is patterned after the Russian method for sturgeon except that the American gear is lighter. A snag-line tackle consists of from 2,000 to 10,000 hooks. Spear-point hooks (6/0 to 9/9) are individually threaded with nylon filament twine (No. 12 to 20), 20 inches in length, doubled and looped onto the main line 10 inches apart.

The lines, in 500 hook sections, are reefed on an iron rail which is mounted aft with the clear end extending slightly beyond the stern to allow the hooks to clear the boat when running out. Each rail will hold 1,000 hooks.

After setting, the lines are staked or anchored at each end and the fishing depth is adjusted by the length of the cords on the buoys that are placed at intervals along the line.

To the novice, the catching qualities of snag-line tackle is quite amazing because no bait is used. Although spoonbill and sturgeon are usually snagged, the smaller fish such as catfish, buffalo, redfish, speckled trout (Weakfish) and other varieties do bite the naked hook. The author has caught as much as a 1,000 pounds of spoonbill on a thousand-hook line.

(over)

ABSTRACTER: Kathryn L. Osterhaug

2.114 VARIABLE PITCH PROPELLERS ON FISHING CRAFT

Anonymous
National Fisherman 36, 13-14 (October 1955)

More than 95 percent of all engines in Scandinavian fishing craft from 10 hp. to 200 hp. are fitted with variable-pitch propellers. R. G. Andersen of Tuxham A/S, Denmark has said that experience in Scandinavia has proven the variable-pitch propeller system to be almost indispensable for any kind of fishery using lines or nets. The variable pitch provides maximum hauling power at any vessel speed, whether high, low, or stationary. When the vessel has finished fishing, the skipper can increase the pitch of the propeller and make use of the full engine power to obtain maximum speed after hauling is finished. It is the only system that enables fishing boats to profit by full power for hauling as well as for speed.

All difficulties originating from incorrect ratios between vessel, engine power, engine speed, and propeller form are principally done away with when the variable pitch system is employed because the pitch of the propeller may be adjusted during the run of the engine until the optimum pitch has been reached.

(over)

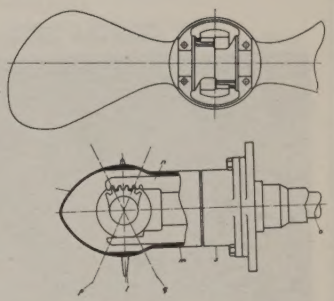


Diagram 1. Typical variable-pitch propeller system for use with engines of smaller horsepower. The propeller blades "l" are rotated in the propeller boss "m" by the double rack-and-pinion mechanism "n" when the propeller shaft "o" is moved ahead or astern.

ABSTRACTER: Kathryn L. Osterhaug

TRIMETHYLAMINE IN ICED FLOUNDER

BACTERIOLOGY OF FILLETS

SNAG-LINE FISHING

VARIABLE PITCH PROPELLERS

2.01 (Cross Reference: 2.3, 3.18)

the day, there is a gradual build up that is dependent upon the bacterial load on the whole fish. Usually, however, the cutting boards even when washed, supposedly sterilized, and left overnight to dry are so heavily contaminated that the fillet bacterial count is in the millions right from the start.

Reduction of contamination. --The cheapest and most efficient way to reduce contamination is to remove the bacteria-laden slime from the fish by thorough washing before they reach the cutting line. Fish that were washed for two minutes in a heavy wire revolving cage under a light spray of water produced fillets with 61 to 98 percent less bacteria than fillets from unwashed fish. Fillet bacteria counts were also reduced 80 to 90 percent by replacing hand skinning with machine skinning.

Disinfectants on the cutting line. --On cutting boards, belts, knives, and other surfaces in continuous contact with fish, disinfectants are of little value because of the heavy contamination from the fish. Removing the gross contamination by washing the fish and the surfaces in contact with fish will usually accomplish far more than the use of disinfectants.

Preservative dips for fillets. --No chemical solution has ever been found that will kill bacteria on the surface of the fillets and not affect the flavor and odor of the fillets.

Chilling and maintaining low temperatures. --Once the fillets have been packed they should be chilled immediately, preferably in a blast freezer, sharp freezer room, or frozen storage room. Boxes of fresh fillets that were frozen to a depth of 1/4 inch and then held at 31.5° F. kept more than twice as long as fillets held at 37° F.

2.114

This adjustment may be made without disengagement of the engine simply by turning the wheel in the pilot house. It also enables the engine to run with maximum torque in any vessel.

In this way the propeller blades may be adjusted to any intermediate position including neutral. In this position the screw propels the vessel neither ahead nor astern, and by adjusting the propeller to slow ahead or slow astern, the skipper can keep the vessel at a standstill in spite of the action of wind or sea. In this way he can entirely fix the position of the vessel while the engine works at full speed (or any other speed) on the winch during the hauling of fishing gear.

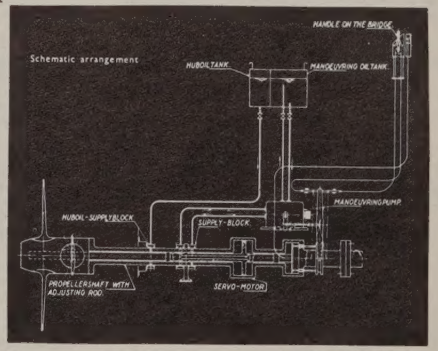


Diagram 2. Schematic arrangement of a controllable pitch propeller controlled from the bridge.

2.01 (Cross Reference: 8.8)

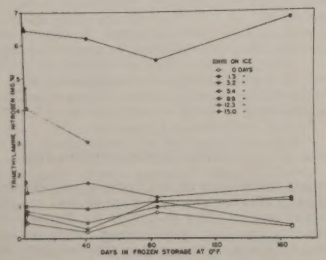


Figure 1. Trimethylamine content of English sole fillets (trimethylamine content versus time of frozen storage).

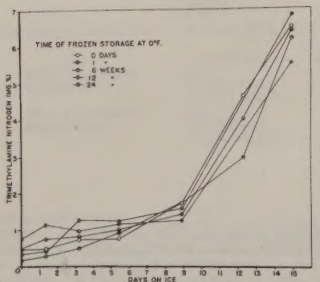


Figure 2. Trimethylamine content of English sole fillets (trimethylamine content versus time of iced storage).

2.1123

Walker D. Wallace, looking for signs of fish.

Using hands to land this one.

Snag-line with hooks reefed on angle of rail. Each end of line is staked or anchored. Line is buoyed up near surface with floats. This tackle is ready to go overboard.

2.1121 GEAR RESEARCH AND DEVELOPMENT. BEHAVIOR OF SHRIMP TRAWL VIEWED WITH UNDERWATER TELEVISION

Anonymous
Commercial Fisheries Review 17, 32 (July 1955)

Results of tests using underwater TV showed that an important consideration in the performance of trawl nets is towing speed. An excessive rate of speed caused leap-frogging of lead lines over the bottom, with resulting loss of probable catches. Too slow a rate of speed resulted in a smaller angle of doors and decreased spread of the net opening. An excessive amount of trawl cable played out also resulted in a smaller angle of doors and reduced spread of net.

By increasing the length of the towing legs between trawl wings and doors by 8 feet on the 40-foot trawl, the angle of sheer of the trawl doors was increased, the opening of the net was enlarged, and individual meshes were opened more fully. At the same calculated speed (2 knots) the sheer increased 5 to 7 degrees. This greater sheer enlarged the horizontal opening of the trawl by a calculated 6 feet and did not cause any decrease in vertical height of the net (calculated to be 4 feet). The mesh shape appeared to be more square than diamond shape.

Determination of the maximum and optimum spread are dependent upon further observations, as is the application of this same principle to other types of shrimp trawls.

Reprinted in part

2.15 BRUISED CONDITION OF THE AMERICAN PLAICE

Templeman, W. and Pitt, T. K. (Newfoundland Fisheries Research Station, St. John's, Newfoundland)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations No. 59, 3-5 (August 1954)

The American plaice (Hippoglossoides platessoides) bruises very easily. The bruises are red in color and consist of blotches of blood (ruptured capillaries) beneath the skin. Bruises may be found on any part of the fish, but they are usually more frequent and larger in size on the white or blind side. On the average, these bruises do not penetrate the flesh by more than 1/10th inch.

Objective.--The object of this study was to determine the cause of the bruised condition and to evaluate various methods of reducing it.

Method.--Plaice 15 1/2 to 22 inches in length were taken almost immediately after they were landed on the deck of the vessel and divided into 4 lots. The plaice in each lot were tagged with a number, and each lot was treated differently. Plaice in lot 1 were subjected to the "Fisherman's cut", which cuts away part of the belly flap and most of the viscera. Plaice in lot 2 were cut deeply across the throat, split down the middle, and eviscerated. Plaice in lot 3 were merely cut at the throat. Plaice in lot 4 were left whole or round. Each of the lots was processed and iced in fish boxes with dispatch.

Upon arrival on shore the plaice in each of the lots were mixed together and filleted. Each pair of fillets received the tag number of the plaice from which it was cut. All of the paired fillets were then evaluated for bruises or blood spots larger than 1/10th square inch by a person unfamiliar with the tag numbers.

Results.--The results of the evaluation are shown in table 1, over. Cutting the fish to sever the main blood vessels reduced the incidence of the bruises.

(over)

ABSTRACTER: Martin Heerdt

2.15 PRESERVATION OF FISH IN TRAWLER HOLDS. II. THE EFFECT OF VARIOUS TYPES OF PEN SURFACES ON THE KEEPING TIME OF FISH

MacCallum, W. A. (Atlantic Fisheries Experimental Station, Halifax, Nova Scotia)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations No. 59, 18-22 (August 1954)

Object.--This study was made to determine the effect of the type of hold or pen lining on the quality of the fish.

Method.--Lining materials that were placed on the bottoms of two fish pens in a trawler were as follows: (1) contaminated spruce boards that had been used in trawler holds, (2) freshly planed spruce boards, (3) freshly planed and painted spruce boards, (4) unpainted recently set cement, (5) transparent plastic sheet, and (5) aluminum sheet. All of these surfaces were brushed and washed with clean warm tap water before being placed in the hold at the start of each trip. Lining materials that were placed against the wings of the previously mentioned two fish pens in the trawler hold were as follows: (1) contaminated spruce boards that had been used before in trawler holds, (2) boards similar to those in (1) above but completely sterilized with steam, under pressure, (3) freshly planed and painted spruce boards, (4) freshly planed and shellacked spruce boards, (5) aluminum alloy sheet and aluminum alloy corrugated sections. All of these surfaces were brushed and washed with clean warm tap water before being placed in the hold at the start of each trip. The original wood back wall boards and front pen or division boards that were also tested were washed with water drawn from the harbor and heated.

The pen lining materials under test were covered with a single layer of cod and haddock which was then iced liberally. When the trawler arrived in port, samples of cod and haddock in contact with the

(over)

ABSTRACTER: Martin Heerdt

2.15 PRESERVATION OF FISH IN TRAWLER HOLDS. III. SCREENS AS A PROTECTION AGAINST CONTAMINATED PEN WALLS

MacCallum, W. A. (Atlantic Fisheries Experimental Station, Halifax, Nova Scotia)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations No. 59, 22-27 (August 1954)

Purpose.--A study was made to determine (1) the ability of 1 1/2-inch mesh wire screens installed one inch away from the wings of the fish pen to gather and retain a wall of ice during icing of the fish and (2) whether the use of wire screens is practical.

Method.--Opposite wings or wood sides of a fish pen in the hold of a trawler were used for this study. The side surfaces were washed after each trip with harbor water that had been warmed. Screens made of 12-gauge 1 1/2-inch galvanized iron wire mesh were attached to one of the wings with aluminum alloy angles. The opposite wing was not screened.

At sea the fish pen was filled in a normal manner with ice and fish. No effort was made to shield the fish from either the screened or the unscreened wing. After the trawler had returned to port the fish pen and the fish in it were examined.

Results.--Fish that had been stowed against the screen were entirely free from bilgy odor on the screen side and a trifle stale on the opposite side. In all cases, fish that had been stored against the screen were either equal or superior in quality, judged by smell, to fish that were stored in ice in the center of the pen. All of the fish that were stored against the wood wing of the pen were bilgy or extremely bilgy. Examination of the screened side of the pen showed that the crushed ice had passed through the wire mesh and filled the space between the wing and the screen in the process of icing the

(over)

ABSTRACTER: Martin Heerdt

TV TRAWL OBSERVATIONS

SANITATION OF FISH HOLDS

BRUISED PLAICE FLESH

SCREENS FOR FISH PEN WALLS

2.15 (Cross References: 2.19, 2.115)

test surfaces were examined for spoilage odors. Fillets cut from the samples of cod and haddock were also examined for spoilage odors.

Results. --Boards that had been used before in trawler hold provided surfaces that contributed most to the development of bilgy odors. Cod and haddock taken from back wall boards and from front pen boards had strong bilgy odors after only 4 days in ice in the hold. Cod and haddock taken from the bottom and wing boards of the pen were bilgy after 7 days. Brushing and washing, therefore, did not clean the rough wood surfaces in the trawler hold.

Sterilized boards did not contribute to the development of bilgy odors on the first trip, but when the boards were washed after each trip and used on succeeding trips they too became contaminated and unsuitable for use in the fish hold. Cod and haddock in contact with the planed unpainted spruce and with unpainted cement surfaces spoiled in 7 days. Plastic, however, offered a somewhat more impervious surface than either planed wood or cement. The most satisfactory surfaces were the freshly painted and shellacked wood boards and the aluminum alloys. Against these surfaces the fish did not develop bilgy odors for 7 to 10 days. Wood surfaces, even if painted and shellacked, cannot be kept in good condition where they are subjected to the rough treatment of the fish pen. Surface treatments for wood, therefore, are of little practical value. These results confirm the findings on the quality of fish landed from the aluminum-lined holds of the trawlers Cape Scatari and Cape Fourchu.

2.15 (Cross References: 2.19, 2.115)

fish. This appears to be a practical way, shielding the fish and providing a source of refrigeration for the wing surface of the pen.

Estimates for installing screens indicate a cost of approximately $4,000.00 which is much lower than the cost of all metal pens. Vessel owners have indicated that they would not appreciate the extra cost of cleaning both the screens and the walls behind them during the time that the vessel is in port. They also claim that the practical life of the screens is an unknown factor. During the 3 months that the experimental screens have been in use, they have shown no sign of deterioration except for the loss of zinc from the galvanized wire.

Conclusions. --Wire screens accomplish the following: (1) give protection from heavily contaminated surfaces, (2) are cheaper than solid metal surface construction, (3) are the most effective means of protection yet devised, (4) decrease the amount of ice normally required against contaminated surfaces, and (5) make icing an easier task.

2.1121 (Cross Reference 2.14)

2.15 (Cross Reference 1.60)

Bruising in fillets of American plaice from the Grand Bank under four different treatments immediately after capture. (All examinations for bruises were carried out on the fillets only.)

TREATMENT	NUMBER OF FISH EXAMINED			TOTALS
	Trawler: No. 1 Nov. 30-Dec. 3/52	No. 2 May 5/53	No. 3 Sept. 15/53	
Throat cut, gut out	38	48	44	130
"Fisherman's Cut"	34	48	53	135
Throat cut, gut in	39	49	49	137
Whole	75	50	48	173

	PER CENT FISH WITH BRUISES			AVERAGES OF ALL OBSERVATIONS
	Trawler: No. 1 Nov. 30-Dec. 3/52	No. 2 May 5/53	No. 3 Sept. 15/53	
Throat cut, gut out	37	33	41	37
"Fisherman's Cut"	35	65	47	50
Throat cut, gut in	49	53	80	61
Whole	83	80	92	84

	TOTAL AREA BRUISES PER 100 FISH SQ. IN.			
	Trawler: No. 1 Nov. 30-Dec. 3/52	No. 2 May 5/53	No. 3 Sept. 15/53	
Throat cut, gut out	6	8	5	6
"Fisherman's Cut"	6	18	10	12
Throat cut, gut in	16	17	24	19
Whole	38	48	60	45

2.6 OPERATING COSTS OF ATLANTIC LONGLINERS AND DRAGGERS. PART I

Proskie, John
Canadian Fisherman 42, 12, 30-34 (September 1955)

Using records available for three years, the Markets and Economics Service, Department of Fisheries, Ottawa, has investigated the performance of several classes of fishing craft under current cost-price relationships. The table, over, indicates the extent of coverage by type and size-class of boats as well as by area.

The investigation was limited to an examination of two general types of fishing boats, long-liners and draggers. The former represents a relatively passive method and the latter a more active method of fishing.

The two types of fishing vessels are different in basic design and have considerable structural differences to meet the requirements of the use to which they are put.

Long-liners. --The original capital cost of the smaller (35-50 foot) long-liner, equipped and ready for fishing, range from $2,000 to about $10,000. Those built most recently have been affected by the increase in cost of materials and labor. They were built without government financial assistance. The initial cost of the larger (51-60 foot) long-liners, built under the Canadian government's assistance plan, range from an average of $14,897 for 54-foot boats built in 1950 to an average of $25,390 for 59.9-foot boats built in 1954.

Factors contributing to the higher capital costs of the larger type long-liners are (a) that these boats are usually built under the government assistance program which calls for better materials and stronger construction, (b) that the diesel engines required cost almost three times as much as equivalent gasoline engines, and (c) that elaborate electronic devices are usually installed on them. These devices make fishing both safer and more productive but do add to capital costs.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.17 RECENT RESULTS ON THE EFFICIENCY OF BACTERICIDAL ADDITIVES FOR THE ICING OF FISH. THE EFFECT OF ICE CONTAINING SODIUM NITRITE ON THE KEEPING QUALITY OF COD

Partmann, W.
Fette, Seifen, Anstrichmitt 56, 505-511 (1954)
Zachorowski, T. and Trzesiński, P.
Przem. Rol. Spoż. 8, 65-66 (1954)
Food Science Abstracts 27, 378-379 (July 1955)

Attempts to achieve uniform distribution of bacteriostatic or bactericidal agents in ice used for chilling fish are surveyed. In the experiments, whole fish (cod) as well as homogenized fish (cod and tench) muscle were used. The freshness of the fish was evaluated by assessment of flavor, by determinations of volatile base nitrogen and free tyrosine nitrogen, and by bacterial counts. Results obtained with dispersions of the muscle gave good indications of the relative efficiency of the agents tested. Values obtained with ice containing 0.02 percent of nitrite were used as a standard. The strongest bactericidal action was exerted by formaldehyde, which was active even in a concentration of 0.01 percent. The sulphonamide preparations Salthion liquidum (0.05 percent) or Salthion calcium (0.05 percent) were more active than 0.02 percent nitrite, but 0.05 percent sulphacetamide had no appreciable effect. Several surface-active agents were effective in a concentration of 0.5 to 1 percent. A preparation called Anti-autolysin was ineffective.

Ice containing 0.15 percent of nitrite was used in experiments with gutted and whole cod, which were placed in ice immediately after catching. It was found that gutted, headless cod in ice containing nitrite could be kept in a fresh condition for about 4 to 5 days longer than controls in ordinary ice. Whole fish spoiled equally rapidly in ordinary ice and in ice containing nitrite. Gutted iced cod could

(over)

 Reprinted in whole

2.6 WOOING THE HOUSEWIFE AND HOME CHEF

Anonymous
Southern Fisherman Yearbook 1955, XV, 88-92

The fishing industry has and is receiving excellent promotion through home editors of national consumer magazines, the press, radio and television. Fishery organizations which are providing authentic materials are The National Fisheries Institute, The Shrimp Association of the Americas and The Fishery Council.

The National Fisheries Institute supplies "Fish Lines" to newspaper food editors, industry news to business page editors, scripts to radio broadcasters and telecasters. The Institute also serves as an authorized agent for different segments of the industry supplying recipe sheets and pictures and also contributing to advertising campaigns.

That the Shrimp Association of the Americas has done an important job of educating the public is indicated by the fact that Colliers', Saturday Evening Post, and Readers' Digest (combined circulation of 18,150,000) recently ran full length, illustrated articles about the industry. In the last 3 years the Association has furnished information to the 500 largest dailies in the United States, 1,500 weeklies, syndicates which service the 5,000 large and small dailies and weeklies in the United States, 1,485 radio broadcasters, 340 telecasters, editors of employees' magazines and other special interest publications, 55 farm press editors, and 102 hotel and restaurant magazines and other publications in the food service field.

The Fishery Council's most recent project is to promote, with the aid of Andre Prince, Gourmet, delicious seafood dishes that involve a minimum of preparation. The happy result entices food editors

(over)

 ABSTRACTER: Thelma Rose

3.236 PORTIONED FISH IS OFFERED IN FIVE SIZES

Anonymous
Frosted Food Field XXI, 32, 33 (October 1955)

A new development on the institutional market is a line of custom portion-packs available in five different sizes. The basic idea is to provide the institutional chef with complete control over each serving. Portions are individually cut and frozen so that only the exact amount required for each serving need be prepared. Each portion is either breaded and ready-to-cook, or breaded and fried.

The smaller size custom portions may be used as light luncheon snacks and the larger sizes for luncheon specials and dinners. Costs can be controlled by using the size best suited to the type of meal being served.

The streamlined portion control pack makes it possible to merchandise and control mass feedings of all types, including in-plant, schools and hospitals.

 ABSTRACTER: Kathryn L. Osterhaug

ECONOMICS OF FISHING

FISH PROMOTION

BACTERICIDAL ICE

PORTION CONTROL PACK

2.6

and housewives to serve a variety of seafood often instead of occasionally.

It's a good fish story!

3.236 (Cross Reference: 3.26)

2.6

Draggers.--The capital costs of draggers have also increased. The construction cost of draggers in 1947 amounted to $646 per gross ton and in 1954 to $892. Although some of this increase can be attributed to increase in boat size, improvements in design and the installation of new types of electronic equipment, the major cause has been increase in wage rates and in price of construction material.

Comparison of output.--The most meaningful measure of comparative output is in terms of dollars per man hour of fishing. This is summarized in the table below.

The capital investment per man in the case of draggers is greater on the average than for the new long-liners. Dragging is a more mechanized method of fishing in which capital is used to replace labor to a considerable extent.

NUMBER OF BOATS COVERED, 1952-54

LONG-LINERS

Year	35-50 ft. class Que.	N.S.	Nfld.	51-60 ft. class Que.	N.S.	Nfld.
1952	—	10	—	3	17	—
1953	4	8	—	7	14	—
1954	—	7	5	10	15	9

DRAGGERS

Year	46-50 ft. class Que.	N.B.	P.E.I.	54-60 ft. class Que.	N.B.	P.E.I.	N.S.	Nfld.
1952	4	6	—	—	21	5	—	—
1953	4	11	2	4	24	6	5	—
1954	4	8	—	4	20	10	5	2

AVERAGE GROSS VALUE OF OUTPUT PER MAN-HOUR OF FISHING, 1952-54

LONG-LINERS

Year	35-50 ft. class Que.	N.S.	Nfld.	51-60 ft. class Que.	N.S.	Nfld.
	$	$	$	$	$	$
1952	—	3.59	—	—	3.71	—
1953	1.72	3.30	—	1.66	3.87	—
1954	—	2.66	3.21	1.86	3.59	3.86

DRAGGERS

Year	46-50 ft. class Que.	N.B.	P.E.I.	54-60 ft. class Que.	N.B.	P.E.I.	N.S.	Nfld.
	$	$	$	$	$	$	$	$
1952	1.89	2.93	—	—	3.57	—	—	—
1953	0.89	2.05	3.41	2.50	2.94	4.26	4.18	—
1954	2.83	2.96	—	3.36	3.99	4.21	4.45	4.45

3.17

be kept in a fresh condition for as long as 17 days. The bacterial count of the flesh of cod chilled in ordinary ice was substantially higher than that of the fish kept in ice containing nitrite. The external appearance of cod kept in ice with added nitrite was rather poor, however; the skin was greyish and the flesh acquired a pinky tinge.

3.18 HYGIENE IN FACTORIES

Aschehoug, V.
Tidsskr. Hermetikind 40, 73-76 (1954)
Wld Fish. Abstr. 6, 37 (1955)
Food Science Abstracts 27, 472 (July 1955)

The conditions in 88 canning plants on the Norwegian coast were investigated by the Canning Industry Research Laboratory, in cooperation with the Government Industrial Hygiene Department and with the management of the canning plants. The investigation covered: (1) factory buildings and plant layout; (2) water supply; (3) raw materials; (4) machinery and other installations; (5) packing materials; (6) industrial waste; and (7) personal hygiene. Special attention was given to cleaning methods and to orderly conditions in the rooms. Problems connected with the sealing of cans and the sterilization of canned foods were also investigated. After the inspection, reports were issued from the Laboratory to the factories, with recommendations for improvement where necessary. Processing times for canned foods recommended by the Research Laboratory are based on good hygienic conditions in the factories. In abnormal conditions during the war, when meat used for canning was sometimes highly contaminated with bacteria, the usual processing methods were insufficient to obtain commercial sterility of the canned product; improvement in quality of the meat led to better conditions. When contaminated raw material is used, there is a danger of infection of factory rooms and equipment which is difficult to eliminate. During the canning of fish, large numbers of bacteria may be brought into the factory with the raw material, bacterial counts on the surface of the fish and in the gills and intestines being particularly high. The slime and blood-water from fish is very favorable for the growth of bacteria. Fish may be contaminated by transport in dirty wooden boxes; the use of aluminum boxes is strongly recommended. Bacterial counts were made in connection with the washing and disinfection of fish boxes. Dipping the boxes in a 2 percent sodium hypochlorite solution for

(over)

Reprinted in whole

3.238 WAX-COATED FROZEN MEATS GAIN AS ADVANCES IN MACHINERY FIT PROCESS TO MASS OUTPUT

Anonymous
Quick Frozen Foods 18, 112 (September 1955)

A micro-crystalline plastic wax for coating frozen foods has been in use for about 11 years. Until recently its use was limited to locker plants and other small operators because only manual dipping equipment was available.

The recent development of automatic wax coating equipment is helping to make it possible for frozen-meat packers to adopt the process for high-speed production lines.

Currently the wax-sealed meats are sold by supermarket chains in St. Louis, throughout central Ohio and in Minnesota. The frozen and wax-seal packs have been approved by the United States Department of Agriculture.

All foods are frozen, unwrapped, before being coated. The frozen food is placed on the machine's feed table and is conveyed through the dipping tank on a wire belt. As the food emerges from the tank it is completely sealed by a curtain of hot wax flowing over it.

An Ohio firm has just completed a $300,000 meat processing plant to house its plastic-waxing operations. Its butchers, working on an assembly line basis, cut the frozen meat on power saws. A trained waxing machine operator weighs, labels, and coats about 2,000 pounds of meat daily. Production is expected to reach 60,000 pounds daily when personnel are fully trained. The firm plans to add fish and poultry in the future.

 ABSTRACTER: Kathryn L. Osterhaug

3.237 FOR TOP-QUALITY FRIED FOODS CURB THESE 6 TROUBLE FACTORS

Quammen, W. A. (Procter and Gamble Co., Cincinnati, Ohio)
Food Engineering 27, 76-77 (August 1955)

Quality fried foods must be cooked in bland, stable, frying fat. Fat quality must also be maintained during frying. After continued use, any fat deteriorates, as is evidenced by its tendency to darken, foam, smoke, develop poor flavor, and form gum. Means of avoiding or minimizing these effects were studied.

The important factors that accelerate fat breakdown are the following:

Excessive heat. --Color and free fatty acid development are accelerated by heat according to the data in table 1, over. To keep changes in the oil at a minimum, foods should be deep fried at the lowest temperature compatible with the desired color and degree of cook. Color and flavor are the best criteria for judging the suitability of a fat for continued frying use.

Free fatty acid is a valid measure of fat quality only if used in conjuntion with color and flavor tests. Localized rapid heat transfer through the wall of firing tubes that have developed thin spots from corrosion or burning of the metal may scorch or burn the oil.

Metallic contamination. --Contamination of frying fat with copper and some alloys containing copper can accelerate fat deterioration. To measure this effect, copper, brass, and monel plates were placed, one at a time, in frying kettles. Results of these tests shown in table 2, over, indicate that fat in contact with these metals darkened rapidly, but that free fatty acid increased only if the fat was in contact with copper or monel.

Soap and caustic residues. --Frying equipment is usually drained and washed at regular intervals. The washing operation should include thorough rinsing to remove all traces of soap, alkali, or other cleaning agents that speed fat breakdown. The data in table 2, over, shows the effect of improper rinsing of the kettle on fat color.

(over)

 ABSTRACTER: Martin Heerdt

3.238 CUP CONTAINERS AID PREPARED FOOD HANDLING

Willett, Roslyn (Paper Cup and Container Institute, New York City, New York)
Frosted Food Field XXI, 15, 18 (October 1955)

Round, nested, heavy-duty paper containers offer a variety of advantages to the packers of the following types of prepared frozen foods:

Soups, chowders and stews; sauces and dressings; casserole dishes, fricassees, and other mixed dishes; pot pies; fruit cups, purees and combinations of fruits or vegetables with fruit or vegetable juices; seafoods and prepared seafood dishes.

The advantages fall into four primary groups: (1) protection, (2) convenience, (3) costs, and (4) merchandising.

Protection. --Round, nested, heavy-duty paper containers have the following protective features:

1. As manufactured and sold, they have a bacteria count so low that they may be considered sterile. They cannot contaminate the food packed in them.
2. Package and lid are leak-proof.
3. Heavy-duty wax- or plastic-coated paper containers have excellent resistance to transmission of moisture vapor and odors, so that prepared frozen foods may be kept in frozen storage in them for as many months as are recommended for the foods themselves.
4. With their heavy wax or plastic coatings, they have excellent resistance to food acids and alkalis, and to grease.
5. One of the major problems of prepared frozen-food packers is that of deterioration during accidental thaws. Heavy-duty wax- or plastic-coated containers are good insulators, and may be expected to keep food solid for long periods.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

PLANT SANITATION

QUALITY CONTROL FOR FRYING OILS

PACKAGING WITH PLASTIC WAX

FROZEN FOOD CONTAINERS

3.237

Burnt food particles. --Fragments of food and breading that are left behind during deep frying will become scorched or burnt and produce off flavors if they are not filtered out of the fat. Carbonaceous material from burned food particles in the fat not only affects the flavor of the fat and the food but also may pepper the food with tiny black specks.

Inadequate filtering. --Frying fats should be filtered after each 8 hours of use. Avoid using filter material that contains traces of metals that may induce oxidative rancidity.

Insufficient turnover. --Efficient frying operations use up the fat in the kettle every 10 to 20 hours so that the fat never has to be discarded because of deterioration in quality. This means that the amount of food that was fried in 10 to 20 hours absorbed a quantity of oil equal to that in the kettle at the start of frying. Reducing the amount of fat in the kettle to a minimum by using a smaller kettle, or increasing the food put through will increase the rate of fat turnover if the present rate is low.

TABLE I

Temp (Deg. F)	Lovibond Red Color: Control (No Frying)	Lovibond Red Color: After 5 Days' Frying	Free Fatty Acid: Control (No Frying)	Free Fatty Acid: After 5 Days' Frying
350	4.1	37.2	.05	.23
385	4.1	123.0	.05	.36

TABLE III

Kettle	Kettle Treatment	5th Day Frying Lovibond Red Color
No. 1	Alkali washed. Proper rinse	18.0
No. 2.	Alkali washed, No rinse	41.0

TABLE II

Metal Added*	Fresh Fat: Lovibond Red Color	Fresh Fat: Free Fatty Acid	After 4 1/2 Hr. Frying: Lovibond Red Color	After 4 1/2 Hr. Frying: Free Fatty Acid
Control (no added metal)	4.3	.05	7.5	.11
Brass disk	4.3	.05	10.9	.11
Monel disk	4.3	.05	10.3	.15
Copper disk	4.3	.05	13.4	.19

* 1 sq. cm. metal/10g fat

3.238

6. They provide complete protection against chemical reactions catalyzed by light.
7. Filled packages can be stacked as high as necessary, with no worry about pressure.
8. Resistance to puncture, bursting and abrasion is high.

Convenience. --Because of their tapered sides and uniform dimensions, cup containers nest when empty permitting storage of large numbers in a small space. They are easy to fill because of their wide, open tops, rigidity, and non-tipping characteristics. Filling and capping is a simple two-step operation as no overwraps, tying or sealing are required. They lend themselves to high speed processing and filling as all of the automatic filling machines manufactured by major companies are adapted to the use of round-nested containers at their maximum rated speeds.

Costs. --Heavy-duty wax- or plastic-coated containers are low-cost containers for frozen foods. They are low in initial cost, take little raw storage space, and are filled and closed simply and rapidly.

Merchandising. --Round, nested, heavy-duty paper containers can be printed in colors to order both on the body of the container and on the closure.

3.18

1/2 minute proved to be of value; still better results were obtained with a 5 percent solution. Preliminary experiments are being carried out with synthetic detergents. Hygienic conditions in the canning of vegetables, especially peas, are also discussed.

3.238

3.30 INTERNATIONAL PERMANENT COMMITTEE ON CANNED FOODS

Anonymous
Commercial Fisheries Review 17, 65-66 (June 1955)

The International Permanent Committee on Canned Foods (CIPC) met at Göteborg, Sweden, September 27-28, 1955.

Fifty delegates and advisers were present from Belgium, France, West Germany, Morocco, the Netherlands, Portugal, Sweden, Switzerland, and the United Kingdom. Observers from Denmark, Norway, Tin Research Institute and the Food and Agriculture Organization (FAO) were also present.

The delegates split up into various commissions. The Scientific Commission discussed ways and means of standardizing analytical methods and cooperating with the American Association of Agricultural Chemists. An international survey will be available in the near future. A similar survey on the use of artificial colorings has been made but publication will be delayed as many countries are amending their legislation in this field.

The Commission for the Standardization of Cans for Fish has approved for recommendation a list of 12 sizes, and other sizes will be given further study.

The Commission for the Regulation and Definition of Canned Fish discussed the problem of using frozen sardines for subsequent canning, the question of standardizing the declarations of weight of contents on the labels, the definitions of marinades in various languages, the definition of tunas and the use of preservatives in the handling and processing of fish for subsequent canning.

(over)

 ABSTRACTER: Lynne McKee

3.4 ANSWERS TO INQUIRIES -- SMOKED EELS

Anonymous
Food Preservation Quarterly 15, 36 (June 1955)

The eels should weigh from 9 to 14 ounces, have a bright appearance, and be alive at the commencement of processing. It is best not to use eels caught in muddy waters, for they may have an unpleasant taste. Two methods are used to remove mucus from the surface of the eels. One procedure is to cover them with fine salt for three hours, then brush them vigorously, and rinse in clean water. A quicker method, which does not affect the quality of the fish, is to place them in a tub and cover with a one percent solution of ammonia (1 pint of ammonia to 100 pints of water), which is later rinsed off with plenty of clean water. The live fish may be made less slippery to handle if each one is covered with sawdust.

After the eels have been transferred to the cleaning bench, the workers may dip their hands in dry salt to reduce slipping. The eels are opened and cleaned, care being taken to remove all blood along the backbone, and then washed thoroughly.

Salting in 10 percent brine (40° salinometer) gives a more tender and more delicately flavored product, but at this concentration there is risk of deterioration in hot weather. Ice is sometimes added to the brine to cool it, but more frequently concentrated brine (100° salinometer) is used or the fish are stretched and laid parallel in dry salt. Salting requires 5-24 hours according to the market for which the eels are intended. After salting, the fish must be washed thoroughly, as over-salting leaves a white bloom on the skin after smoking.

For smoking, the eels are hung on long hooks which pierce the fish from the throat to the back of the neck. Tenterhooks fitted on wooden rods are better for large eels, and S hooks are used for very large ones, which are attached to the hook by means of wire fixed around the body above the anus. When they are on the hooks the eels are dipped for a few seconds into a vat of boiling water until the

(over)

 Reprinted in whole

3.33 HOW TIMED-PROGRAM CONTROL CAN INVIGORATE YOUR RETORTING

Ziemba, John V.
Food Engineering 27, 86-87, 159 (September 1955)

Processors of canned and glass-packed foods have needed a flexible, fully automatic system for obtaining three retorting changeovers: (1) steam cooking with pressure cooling, (2) steam cooking without pressure cooling, or (3) water cooking with pressure during cooking and cooling. A system of this type has been installed in the canning department of a Midwest processor. Specifically, it is an assembly of components for switching from one processing cycle to another with a minimum of wiring and piping. This equipment, which was developed by an instrument company, was installed by the processor to prevent spoilage in canned foods and to relieve the retort operator of the responsibility attributed to improper process timing. Complete control systems have been set up in the canning department of this processor for automatic operation of each of 18 retorts.

To operate each retort, there is a simplified, "packaged" instrument-control unit with temperature and pressure controls. In addition, there is a time-cycling, process-actuating, timed-program controller. This controller consists of a motor-driven, step-disk mechanism that regulates the operation of one to eight electrically-or pneumatically-actuated functions. The time dial of each control is equipped with movable program-trip pins for "on" and "off" retort functions. Each pin is manually positioned to the exact time at which a retort operation--like venting, cooking, or cooling--is to be carried out. Pin settings are then duplicated in the step mechanism by latch-trip pins set in corresponding notches. As a result, retort operators no longer need to make computations that are subject to error when setting the retorting-processing cycle.

(over)

 ABSTRACTER: Martin Heerdt

3.4 INHIBITION OF MOLD AND YEAST DEVELOPMENT IN FISH PRODUCTS

Boyd, J. W. and Tarr, H. L. A. (Pacific Fisheries Experimental Station, Vancouver, B. C.)
Food Technology 9, 411-412 (August 1955)

Sorbic acid has been used effectively as a fungistat for cheese and has been shown to be harmless as a dietary component in low concentrations (0.1 percent). In the following study, sorbic acid alone or in combination with chlorotetracycline was used to retard the development of molds and yeasts in smoked fish.

Experiment 1.--Sodium chloride solutions, 20 percent weight per volume, and adjusted to a pH of 7.0--to effect solution of the sorbic acid--were prepared with the following additives: sorbic acid, 0.1 and 0.2 percent; chlorotetracycline 0.0005 and 0.001 percent; and sorbic acid 0.1 percent with chlorotetracycline 0.0005 percent. Pieces of fresh halibut (Hippoglossus stenolepis) about 3 x 3 x 1 inches in size were divided into 6 lots. Lots 1 to 5 each were soaked for 15 minutes in a different one of the above solutions. Lot 6 was soaked in plain sodium chloride solution. All of the lots were then drained and exposed to the air at room temperature for 2 hours. Each lot was oak-wood smoked at 70 percent relative humidity and 20° C. for 6 hours, cooled, and stored at 4° C. in polyethylene bags.

The smoked fish were examined at regular intervals for mold growth during storage. Mold growth began to appear on the sorbic acid-treated samples after about 14 days and was pronounced after 30 days. The chlorotetracycline treatment was ineffective.

Experiment 2.--Pieces of halibut, red spring salmon (Oncorhynchus tshawytscha), and sablefish (Anoplopoma fimbria) were soaked in solutions similar to those used in experiment 1, except for the following differences: Higher concentrations of sorbic acid were used (0.5 and 1.0 percent) and the fish were soaked in these solutions for 1 hour. Tables 1 and 2, over, show that visible mold growth and the viable yeasts and molds were more effectively inhibited by the higher concentrations of sorbic acid.

(over)

 ABSTRACTER: Martin Heerdt

COMMITTEE ON CANNED FOODS

RETORT CONTROLS FOR CANNING

SMOKED EELS

MOLD INHIBITOR FOR SMOKED FISH

3.33

In the short time that this multi-purpose system has been in use it has exceeded all expectations with its trouble-free operation. Specifically, it has accomplished the following: (1) completely eliminated errors common to manually-operated, retort-venting operations, (2) abolished the inaccuracies of conventional methods of timing retort cooking, (3) permitted a fully automatic transfer of operations from cook to cool, (4) automatically compensated for variations in temperature, amount, and pressure of cooling water, (5) provided significant savings in water consumption, because of greater accuracy in feeding water into the retorts.

3.30

The Commission for the Organization of the Third International Congress on Canned Foods was organized. This congress will take place in September 1956 at Genoa, Italy in conjunction with the Canned Foods and Packaging Fair at Parma.

The FAO observers took part in the informal discussions of the commissions.

Following the CIPC meeting, the Swedish Institute for Food Preservation Research organized a 3-day symposium on Nutritive Aspects of Preserved Foods at which 20 papers were submitted and 60 participants were present.

3.4

Experiment 3.--Pieces of sablefish and halibut were dusted with sorbic acid at the rate of 1 gram per 800 grams of fish or wrapped in polyethylene sheets the surface of which had been sprinkled with sorbic acid at the rate of 0.5 grams per 100 square inches of surface. Mold growth had not appeared on any of these samples after 50 days of storage.

To determine the amount of sorbic acid residual in smoked halibut and sablefish 3- to 11-gram portions of the finely divided fish were steam distilled along with 50 milliliters of water and 50 grams of magnesium sulfate. The sorbic acid content of these distillates were determined spectroscopically by the procedure of Melnick and Luckmann (1954). About 10 to 15 percent of the sorbic acid present in the brine in which the fish were soaked was absorbed by the fish.

Sorbic acid was also used as an inhibitor of dun mold growth on salt fish. These experiments were reported by the authors in 1954.

TABLE 1

Inhibition of visible mold development in smoked fish by sorbic acid and chlorotetracycline

Concentration of preservative in brine (%)	Visible mold after 40 days' storage at 4° C.		
	Salmon	Halibut	Sable-fish
None	++++	+++	+++
SA, 1.0	–	–	+
SA, 0.5	–	–	+
CTC, 0.001	++++	+++	+++
SA, 0.5 + CTC, 0.0005	++	++	++

[1] Legend: – = None, + slight, ++ moderate, +++ marked, ++++ intense.

TABLE 2

Effect of sorbic acid and chlorotetracycline on growth of yeasts and molds in smoked fish

Concentration of preservative in brine (%)	Visible yeasts (Y) and molds (M)[1] colonies x 10^6 per g.					
	Salmon[2]		Halibut[2]		Sable-fish[3]	
	Y	M	Y	M	Y	M
None	>200	>200	147	14	6.5	1.7
SA, 1.0		2.0		0.5	1.0	<0.01
SA, 0.5	0.5	1.0	0.06	<0.5	2.0	0.09
SA, 0.5 + CTC, 0.0005			36	0.7	13.5	0.03

[1] Stored 47 days
[2] Stored 42 days

3.4

sides of the body open out. Large fish are placed in the center of the smoke house, and smaller eels to the outside.

Hot smoking is in two stages. In the first stage (in Europe) chips of dry oak, birch, beech, or chestnut are burnt to give clean, hot flames. (In Australia most hardwoods are unsuitable for smoking, but light hardwoods such as she-oak give good results. Sawdust and buzzer chips suitable for smoking fish can be obtained from furniture manufacturers.) The flames reach a height of 8-10 inches and the temperature rises quickly to 248-257° F. This is kept up for 5-10 minutes, during which time the fish cooks and loses part of its oil and water. The flames are regulated by means of fire doors.

In the second stage the flames are smothered with chips and sawdust, and the smoke outlet and fire doors are almost closed. Thick smoke arises, and the temperature is maintained at around 104-122° F. Small eels will be smoked in about 90 minutes, big ones in 2-4 hours. Export fish (in Europe) are smoked for 8-12 hours.

The fish are well smoked when the flesh at the level of the anus is easily detachable without the appearance of fat or drops of water along the backbone. The eels are cooled off in the smokehouse, given a light brushing of edible oil on the outside to improve the appearance, and wrapped in transparent cellulose film. From 4 to 33 pounds of fish are packed in long narrow cases.

A hundred pounds of fresh eels yield about 60 pounds of the hot smoked fish, as the loss in gutting is about 5 percent and in smoking about 30 percent.

The simplest smokehouse is a large barrel with a large hole in each end, placed over a hole in the ground which serves as a hearth. A wet bag is used as a cover to keep heat in the barrel and regulate the loss of smoke. A larger smokehouse is usually made entirely of bricks. The bricks comprising the roof are supported on a timber frame, and those in the floor are set with the long axis vertical. Dimensions are approximately 3 feet wide, 6 feet long, and 6 feet high. The door has an iron frame and is divided into three sections to control the smoking. Above the door is a sheet-metal hood which communicates with the chimney and helps to let out the smoke. The chimney is 6-8 inches in diameter and can be opened and closed. About 6 inches below the roof there is an angle-iron running along the side walls to support the smoke rack on which the eels are hung.

3.249 OXIDATIVE RANCIDITY AND DISCOLORATION IN MEAT

Watts, B. M.
Adv. Food Res. 5, 1-52 (1954)
Food Science Abstracts 27, 372 (July 1955)

The susceptibility of fats to oxidative rancidity depends on their structure and on their content of natural anti-oxidants (chiefly tocopherol). These characteristics can be varied in the fat of any one species of animal by varying the fats of the food. Pork and poultry fats, which are more easily oxidized than other animal fats, can be made much more stable by decreasing the concentration of the more unsaturated fatty acids in the diet. This is not commercially practicable, since unsaturated fatty acids are present in such important stock-foods as soya beans, fish meal, and lucerne; but when meat must be stored in conditions favoring oxidative rancidity, it might be possible to select meat from animals which have not received these foods. Feeding large doses of tocopherol also increases the stability of fat, but this is an expensive procedure since only a fraction of the dose is absorbed and stored. Haemoglobin and myoglobin, in the presence of oxygen, accelerate the oxidation of fat, and are probably of importance in frozen minced meat, also in meat during curing in brine (in which the pigments are soluble), but not in the final cured meat (in which the pigments are denatured); the reaction is accelerated by an acid pH. Salt accelerates rancidity; smoke constituents and spices retard it. The use of anti-oxidants is discussed. Fading and discoloration of meat occurs when the ferrous compounds haemoglobin and myoglobin (or their nitric oxide derivatives in cured meat) are oxidized to ferric pigments. Available evidence indicates that both the oxymyoglobin of fresh meat and the nitric oxide myoglobin of cured meat must dissociate to myoglobin before oxidation to the brown ferric metmyoglobin takes place. The dissociation of oxyhaemoglobin increases with decreasing oxygen tension, and fresh meat pigments therefore turn brown more readily as the oxygen tension falls below that of air. In contrast, dissociation of nitric oxide haemoglobin in cured meat progressively increases

(over)

 Reprinted in whole

3.8 CHARACTERIZATION OF BACTERIA RESPONSIBLE FOR THE SPOILAGE OF HERRING PRESERVES

Nikkilä, Olavi E. (University of Turku, Finland)
Reprinted from Suomen Kemistilehti B 28 (1955) 1-3

The cultural characteristics and salt tolerance of 19 strains of bacteria isolated from various types of spoiled herring preserves were determined.

Sample selection.--Canned herring preserves used in this study were purchased at retail. These samples were from 4 to 10 months old. About 15 cans were selected in all to represent the various types of spoilage found in herring preserves.

Bacteriological media.--Plain agar and gelatin containing 0.5 percent sodium chloride was used for isolation of bacteria. Characterization of the most typical plate colonies was accomplished by several transfers from solid media to nutrient broth containing 0.5 percent sodium chloride. Colony size and form was determined from growth on glucose and nutrient agar. Physiological properties and pigment formation were determined from growth on plates and slants. Characteristics used for purposes of identification were determined by the use of differentiating media.

Physiological properties determined were as follows: (1) growth on nutrient broth, (2) hydrolysis of gelatin, casein, and starch, (3) reduction of nitrates to nitrites, (4) indole production in tryptone broth, (5) acetoin formation, (6) changes of litmus milk, and (7) the ability to ferment various carbohydrates. All strains of bacteria were cultured at 22° C.

Bergey's Manual (1948) was used for the classification of the bacteria that were isolated and named below. Code letters and numbers assigned for use in tabulating data were as follows: (C for coccus and R for rods) C1 Micrococcus agilis; C2 and C3 Micrococcus flavus; C4, C5, and C6 Micrococcus luteus; C7, C8, and C9 Micrococcus sp.; C10 and C11 Sarcina flava; C12 Sarcina lutea; C13 Sarcina sp.; R14 Achromobacter liquefaciens; R15 and R16 Achromobacter sp.; R17 Corynebacterium sp.;

(over)

 ABSTRACTER: Martin Heerdt

3.60 FREEZE-DRIED MEAT. I. PREPARATION AND PROPERTIES

Tappel, A. L.; Conroy, A.; Emerson, M. R.; Regier, L. W.; and Stewart, G. F. (University of California, Davis, California)
Food Technology 9, 401-405 (August 1955)

Objective.--To test freeze drying as a method of preservation for edible serving-size pieces of meat, fish, and poultry.

Materials.--Biceps femoris muscle from hind quarters of steer beef (1,000-pound class) graded U.S.D.A. Choice was selected and cut into sample pieces 1-inch thick and 2-inches square. Samples were selected at random for use experimentally and as controls held at 0° F. Serving-size pieces of meats, fish and poultry obtained at wholesale and retail also were among the materials selected for the tests.

Equipment.--Freeze dryers used in the tests were heated with either nicrome wire heating elements (infra-red radiant heat) located on shelves or with warm water circulated through hollow shelves. Absolute pressure was maintained at 0.1 to 0.2 millimeters by a positive displacement vacuum pump in series with a condenser at -40° F. while drying the square samples of beef and at -30° F. while drying the serving-size pieces of meat, fish, and poultry.

Analytical methods.--The water content of the samples was determined after grinding to No. 10 mesh size, by the loss in weight when the sample was held in a vacuum desiccator over magnesium perchlorate at room temperature until constant weight was reached (10 days). Vapor pressure of freeze-dried samples was determined with the apparatus of Legault et al. (1948). Reflectance spectra were measured with an American Optical Company rapid scanning spectrophotometer. Tristimulus values for color were measured with a Colormaster Differential Colorimeter. Rehydration was determined from the weight gain after submerging the freeze-dried beef in water. After rehydration, the beef was seared in hot fat, cooked in a pressure cooker at 10 pounds per square inch for 10 minutes, and evaluated organoleptically by a panel of 7 experienced tasters.

(over)

 ABSTRACTER: Martin Heerdt

4.00 21ST ANNUAL REVIEW OF THE LITERATURE ON FATS, OILS, AND DETERGENTS. I.

Piskur, M. M.
Journal of the American Oil Chemists' Society 32, 255-271 (May 1955)

Production processes.--The quality of whale oil has been investigated with regard to season, species, on-board-ship rendering processes, and storage (Okura and Yamada--Repts. Japan. Marine Products Co. Res. Lab., No 5, 83 pp.). A new process for production of fish-liver oils comprised dehydration of the livers in oil medium and separation of the oil by filtration and centrifugation (Greenfield--U.S. Patent 2,651,647). Sperm whale-head oil was saponified, the fatty alcohol was separated; and on extraction of the alcohols at zero degrees with liquid ammonia, oleyl alcohol was removed leaving a good grade of cetyl alcohol (Itai--Bull. Res. Ind. Non-aq. solns. Tohoku Univ. 3, 97). Splitting of sperm-whale oil by saponification was catalyzed with sodium or magnesium ethylate (Fujii-Repts. Res. Lab. Nippon Suisan Co. 6, 24). Controlled heating of sperm oil with water permitted selective splitting of glycerides so that the natural wax esters could easily be segregated (Grunthal and Mannes--U.S. Patent 2,686,191).

The characteristics of fractions, obtained by crystallization of whiting fatty acids from acetone at various temperatures from -40° to -10° C, were recorded as fundamental information for segregating concentrates of unsaturated and lauric acids from the mixed fatty acids of the oil (Frolova-Rybnoe Khozyaistvo 27, 59). In a study on industrial conditions for interesterification of cuttlefish oil, descriptive data on products produced at various temperatures between -5° and 50° C. and with 0.1 to 1 percent sodium-methoxide catalyst were recorded (Marumo and Tomiyama--J. Oil Chemists' Soc. Japan 2, 232). Holding the cuttlefish oil at 10° with 0.5 percent catalyst for 80 hours increased its cloud point from 2.0° to 35° C. Using tin chloride as the interesterification catalyst was said to induce

(over)

 ABSTRACTER: Martin Heerdt

3 60

Processing. --For comparison with freeze-dried samples, square beef samples of Biceps femoris were vacuum dehydrated at temperatures of 32-59° F. and 86-113° F. and absolute pressures of less than 23 mm. Dehydration at either temperature resulted in extensive "case-hardening." The drying times were 60 to 65 hours and the organoleptic properties of the beef pieces were poor. In contrast, freeze-drying of 1-inch thick pieces of Biceps femoris took place in a shorter time and produced a superior product. Relatively large amounts of Biceps femoris were freeze-dried by both methods of supplying the heat of sublimation. Either method resulted in a drying time of 24 hours to 10 percent moisture, but hot water heat was cheaper and more practical than infra-red heat. At the very beginning of freeze-drying, the side of the meat blocks nearest the heat source dries rapidly. As the ice phase boundary regresses away from the heat source, heat transfer through the dried layer of meat becomes difficult because of low thermal conductivity (0.02 B.T.U./(hr.)(ft.)(°F.)). Steaks (1-inch thick) from halibut, salmon, and sea bass, whole mackerel, sole fillets, and cooked crabmeat, freeze-dried at 37° C. plate temperature and 0.09 mm. pressure required, respectively, 25, 25, 25, > 33, 17, and 13 hours drying time.

Properties. --The properties of freeze-dried muscle, Biceps femoris, are 3-percent moisture after 2 1/2 hours in the dryer; balsa wood-like structure without shrinkage, pink color, 14 to 17 percent brightness, 591 to 592 mμ dominant wave length, and 29 to 32 percent excitation purity. Flavor, texture, and appearance when cooked was similar to that of the frozen samples except that the freeze-dried beef was somewhat drier.

4.00 (Cross References: 4.14, 4.13, 4.19, 4.4, 4.20, 4.21, 4.86, 4.89)

stability in products during storage (Paquot--Bull. mens. inform. ITERG 7, 387).

Fatty products (except detergents). --Equipment to chlorinate shark-liver oil was patented (Aimi et al. --Japan. patent 841 (1954)). A slippery type of oxidation product of fish oils was prepared for use in leather tanning (Sagoschen & Czepelak--Osterr. Leder-Ztg. 8, 270). A drying product is derived from cuttlefish oil by reconstituting its more highly unsaturated fatty acids as mannitol esters (Morii et al. --Japan. patent 993 (1953)). The unsaturated fraction is isolated by fractionation of the methyl esters of the oil by the urea-complex method. Another method comprises partial saponification to remove saturated and low-molecular-weight unsaturated glycerides (Shibayama and Tomioka--Japan. patent 1287 (1953)). Sulfurized sperm oil was added to a patented hydraulic transmission fluid to improve oiliness (Jennings et al --U.S. patent 2,683,120).

Deterioration of fatty materials. --A review was written on the inhibition of the autoxidation of fish oils (Shu--Formosan Sci. 7, 1). Results by Suzuki (J. Chem. Soc. Japan, Ind. Chem. Sect. 56, 20) were interpreted to indicate that the reddening of fish oils is due to a reducing substance as well as peroxides. Privett (Ann. Rept. Hormel Inst., 1953-54, 41) found the selachyl alcohol fraction isolated from unsaponifiable material of fish oils to be an ideal solvent for incorporating antioxidants into fat. Formic acid, acetic acid, butyric acid, enanthic acid, acetaldehyde, butyraldehyde, and enanthole were identified among the products volatilized on aeration of the C_{20} and C_{22} acids of fish oils and were assumed to be the causes of the flavor reversion (Toyama and Matsumoto--J. Chem. Soc. Japan. Ind. Chem. Sect. 56, 972). In similar work on cuttlefish-liver oil C_1 to C_6 acids and 12 amino compounds were isolated (Obata and Matano--J. Oil Chemists' Soc., Japan 2, 112).

3.249

with increasing supply of oxygen. Visible light fades cured meat more rapidly than fresh meat, probably because of a dissociating effect of the light on nitric oxide haemoglobin, similar to that on carbon monoxide haemoglobin. Denaturation of globin causes rapid oxidation of fresh meat pigments but not of nitric oxide haemoglobin, which remains bright red after cooking. Increased acidity, salt, certain metals, freezing, etc., also accelerate the formation of brown pigments in fresh meat, but with cured meat these factors either have no effect or improve color fixation. Free hydrogen peroxide (of bacterial origin) has much less effect on fresh meat than on cured meat, probably owing to the presence of catalase in the fresh meat. Hydrogen donors, such as ascorbic acid, protect cured meat pigments, but accelerate the oxidation of fresh meat pigments.

3.8 (Cross References: 1.2, 0.5)

R18 Flavobacterium breve; and R19 Flavobacterium sewanence.

Table 1 shows how the various strains isolated from herring preserves grew in broth containing sodium chloride. Resistance to high osmotic pressure and chemical preservatives was indicated by the isolation of viable bacteria from the brine. All of the strains identified grew as well or better in nutrient broth with 0.1 and 1 percent sodium chloride as in plain nutrient broth. In addition, all of the strains identified grew at least poorly in nutrient broth containing 3 and 6 percent salt. Strains C3, C4, C5, C7, C8, C10, C11, and R15 grew more vigorously in nutrient broth containing sodium chloride than in plain nutrient broth.

Table 1. Salt tolerance of strains in nutrient broth containing different amounts of sodium chloride.

Growth has been visually estimated and recorded 0--3 (scale: 0 no growth; 3 maximum growth) after 2 weeks at 22° C. and at pH 7.0.

Strain	Growth in broth containing sodium chloride, Per cent NaCl												Maximum salt concentration tolerated
	0	0.1	1	3	6	9	12	15	18	21	24		Per cent NaCl
C 1	2	2	2	2	1	1	0	0	0	0	0		9
C 2	2	2	2	1	1	1	1	1	0	0	0		15
C 3	1	2	3	3	2	2	1	1	0	0	0		15
C 4	1	1	3	3	3	3	2	1	1	0	0		18
C 5	2	3	3	2	1	1	1	1	0	0	0		15
C 6	1	1	1	1	1	0	0	0	0	0	0		6
C 7	1	2	3	2	2	2	1	1	1	0	0		18
C 8	1	3	3	2	2	2	1	1	0	0	0		15
C 9	3	3	3	3	3	3	2	2	1	0	0		18
C 10	1	1	1	1	2	2	2	1	0	0	0		15
C 11	1	3	3	2	2	1	1	1	0	0	0		15
C 12	3	3	3	3	3	2	2	1	1	0	0		18
R 14	3	3	3	3	1	1	1	1	1	0	0	0	15
R 15	1	2	3	2	1	1	1	1	1	1	0	0	18
R 16	2	2	2	1	1	1	0	0	0	0	0		9
R 19	2	2	2	1	1	1	1	0	0	0	0		12

4.89 DOMESTIC SOAP FROM SEAL OIL

Dugal, L. C. and LaFramboise, A. (Gaspé Fisheries Experimental Station, Grande Riviere, P.Q.) Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations No. 59, 27-31 (August 1954)

In some localities it would be desirable if seal oil could be used to make domestic soap. Unfortunately raw seal oil contains unsaturated fatty acids that result in the formation of a soap that is soft and subject to rancidity. Hydrogenation of the seal oil would change the unsaturated fatty acids into saturated acids, however, hydrogenation is not adaptable to home use because of the special equipment required. Polymerization of the oil, which causes the unsaturated fatty acid to react among themselves to eliminate some of the unsaturation, can, however, be accomplished in the home simply by heating the oil at 525° F. for about 4 hours. Care is required in heating so that the oil does not rise above 525° F. and become a fire hazard.

Several experiments were conducted to follow the polymerization reaction. Since polymerization lowers the iodine value and increases the viscosity of the oil, these values were determined on samples withdrawn at hourly intervals. Figure 1 shows the rate at which the iodine value decreases during polymerization of the raw and of the refined oil The speed of this reaction diminishes with time. Seal oil with an original iodine value of 145 does not become resistant to oxidation until its iodine value has been lowered to 90. Figure 1 shows that about 4 hours of heating at 525° F. is required to lower the iodine value of the oil to 90.

Figure 2 shows the increase in viscosity that accompanied polymerization. In practice, the index of viscosity could be used to determine the extent of polymerization and the suitability of the oil for making soap.

Polymerization can be carried out in the same ordinary kitchen kettle that is used in making soap. In fact, the same kettle may be used for both purposes. Soap that was made by the home method from

(over)

 ABSTRACTER: Martin Heerdt

6.132 NEW BEDFORD TO BE ANIMAL FOOD CENTER OF PRODUCTION

Anonymous
Fishing Gazette 72, 63 (August 1955)

A group of 15 New Bedford men have formed a corporation and are planning on producing fowl and animal feeds using industrial fish as a basic component. Milton E. Parker, director of food engineering at the Illinois Institute of Technology, has developed a special process for making a product unusually potent in unidentified growth factor from trash fish and the liquid residue (whey) from cheese manufacture. The process is being patented.

It is anticipated that the end product of the Parker process will be higher in nutritive value and more easily digested than current animal feeds.

At present, a pilot plant is being set up at the New Bedford Institute of Textiles and Technology. If current expectations are realized, the construction of a commercial processing plant may get underway by January 1956.

It is believed that New Bedford's port potential would allow the production of 15 million pounds a year of the Parker animal feed with daily handling of 150 tons of trash fish during the peak periods from May 1 to October 1. No nuisance problem is foreseen as New Bedford is within two days of the fishing grounds and the processing time for the fish would be about an hour.

 ABSTRACTER: Kathryn L. Osterhaug

5.41 PAPERS RELATING TO THE STRUCTURE OF VITAMIN B_{12}

Structure of Vitamin B_{12}

Hodgkin, Dorothy Crowfoot; Pickworth, Jenny; and Robertson, John H. (Laboratory of Chemical Crystallography, Oxford); Trueblood, Kenneth N. and Prosen, Richard J. (Department of Chemistry, University of California, Los Angeles); White, John G. (Frick Laboratory, Princeton) Nature 176, 325-328 (August 20, 1955)

The crystal structure of the hexacarboxylic acid derived from B_{12} and the molecular structure of the vitamin.

The Structure of Vitamin B_{12} and its Hexacarboxylic Acid Degradation Product

Bonnett, R.; Cannon, J. R.; Johnson, A. W.; Sutherland, I.; Todd, A. R. (University Chemical Laboratory, Pembroke Street, Cambridge); and Smith, E. Lester (Glaxo Laboratories, Ltd., Greenford, Middlesex)

B_{12} Puzzle Solved

Anonymous
Chemical Engineering News 33, 3487 (August 22, 1955)

Cannon, Johnson and Todd (Nature 174, 1168-1169 (1954)) had previously isolated hexacarboxylic acid from alkaline hydrolysates of vitamin B_{12}. The cyclic system was determined by x-ray examination. The relative positions of the atoms in the molecule were determined by x-ray crystallographic work, and the calculation was made on the UNIVAC computer of the full three-dimensional electron

(over)

 ABSTRACTER: Neva L. Karrick

6.132 SMALL-SCALE FISH MEAL PRODUCTION UNDER TROPICAL CONDITIONS

Bredon, R. M. and Marshall, B.
E. Afr. agric. J. 20, 98-103 (1954)
Food Science Abstracts 27, 271 (May 1955)

Laboratory investigations were carried out to devise a method which would enable small fishing centers in Uganda to produce fish meal (from unsaleable fish and fish offal) for human and animal consumption, without involving any considerable initial capital expenditure or highly skilled labor. Meals were produced by direct drying, and by cooking in steam or water, or autoclaving, before drying; 8 different methods of processing were used. Both autoclaving and steam-cooking tended to produce a discolored meal, and needed more elaborate apparatus than water-cooking. Meal prepared by direct drying kept in good condition for 2 to 3 months in the tropics before it began to deteriorate and develop a rancid smell. The fish meals prepared by cooking and then drying (with the exception of 1 process) kept for 7 months in open or closed containers without apparent deterioration. The most suitable method was that in which the fish is minced coarsely or chopped into small pieces, put into boiling water (1 pint per pound of raw fish), and heated quickly to 90° C.; it is then drained through muslin and squeezed to remove oil. The residue is dried in the sun or in an oven at 45° to 50° C. for 2 hours, and is finished at 65° to 70° C. The meal is then ready for milling. The finished meal had good keeping quality, with low losses during processing, low oil content (6 percent), and the highest content of vitamin B_{12}. It is hoped that the production of fish meal will form a means of supplementing the protein intake of the population of Uganda; it has been used as a supplementary food for children and mothers, and is recommended for convalescents and growing children.

 Reprinted in whole

SOAP FROM SEAL OIL

STRUCTURE OF VITAMIN B_{12}

NEW FISH MEAL PROCESS

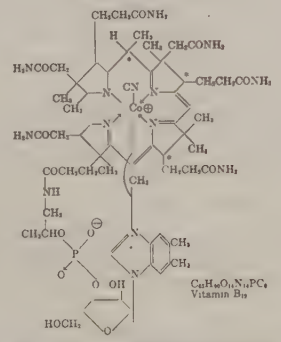
SMALL-SCALE FISH MEAL PRODUCTION

5.41

density distribution in the hexacarboxylic acid.

The formula for vitamin B_{12} is $C_{63}H_{90}O_{14}N_{14}PC_0$. The location of the conjugated system in the structure was shown by x-ray data and the behavior of the vitamin toward chlorination. The structure that has been advanced for the vitamin is as follows:

Figure 2. The B_{12} Molecule



6.132

4.89

polymerized seal oil was reasonably firm. With added rosin this soap showed good lathering properties. Other oils, such as fish oils, which contain unsaturated fatty acids, probably could be treated in the same way to make them suitable for use in making soap

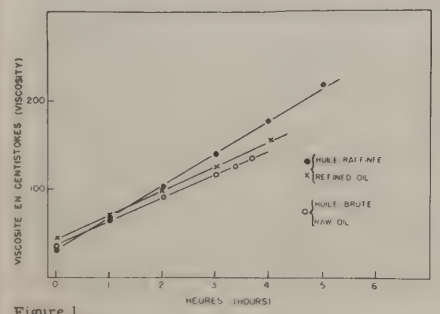
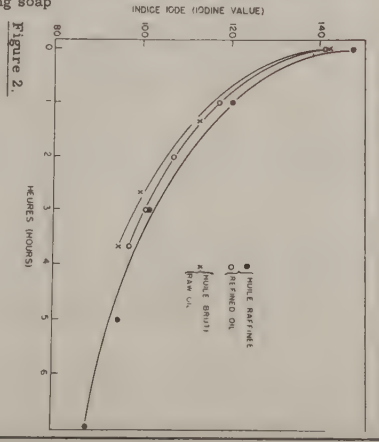


Figure 1.

Figure 2.



6.132

6 134 DRYING QUALITY OF MEAL, III. EVALUATION OF THE BIOLOGICAL VALUE OF PROTEIN IN ORDINARY MEALS. IV. INVESTIGATIONS OF VITAMINS IN WHOLE MEAL

Minsaas, M.; Klungsøyr, M.; Boge, G.; and Sparre, T.
Meld. S.S.F., No. 3, 42-52 (1953)
Food Science Abstracts 27, 138-139 (March 1955)

Herring meals, prepared as described previously (see Vol. 27, Abstr. 607), were used in chick growth experiments; the diets contained 10 to 13 percent of protein, which was either wholly or partly (40 percent) supplied by the meal. Results showed that meal of good quality can be obtained by drying in a flame drier with a high inlet temperature provided that the outlet temperature is kept low. If the outlet temperature is high, the nutritive quality of the meal is impaired; this is due more to decreased digestibility than to destruction of essential amino acids.

Determinations of vitamins in whole meal prepared from large herring were carried out parallel with those in ordinary meal (see Vol. 27, Abstr. 607). The 2 meals were dried in a flame drier with inlet temperatures of 405° to 418° and 720° to 750° C. and outlet temperatures of 77° to 80° and 58° to to 60° C., respectively; a third sample of meal was air-dried. Data on riboflavin, vitamin B_{12}, and pantothenic acid contents showed that very little destruction of vitamins occurred under any of the conditions, but in whole meal the amount of destruction was more variable than in ordinary meal. Whole meal of good quality can be obtained by flame drying if the outlet temperatures used in these experiments are not exceeded.

Reprinted in whole

6.190 THE VALUE OF SEVERAL SUPPLEMENTS AS SOURCES OF UNIDENTIFIED GROWTH FACTORS FOR SWINE

Noland, P. R. J; Stephenson, E. L.; and Diggs, B. (Department of Animal Industry and Veterinary Science, University of Arkansas)
Journal of Animal Science 14, 628-635 (August 1955)

Crossbred weanling pigs, from dams fed corn-soybean meal -15 percent alfalfa meal rations during the gestation - lactation periods, were maintained on concrete floors from birth through the four-week experimental feeding trials. Water and feed were supplied ad libitum and with but one exception replicate pens of five pigs each were used in every treatment for all trials.

In trial 1, the addition of five milligrams of oxytetracycline per pound of feed or 2 percent cod-liver mycelium (residue of cod liver after enzymatic digestion) to a corn-soybean meal basal ration resulted in a significant increase in the rate of gain. However, pigs fed the basal ration supplemented with cod liver mycelium in the absence of antibiotic gained no faster than those fed the basal ration alone. The addition of 3 percent rice bran, 2 percent fermentation product (the specific kind was not mentioned) or 4 percent fish meal (origin not mentioned), to the antibiotic supplemented ration failed to elicit growth responses which were statistically significant. Analysis of variance also failed to indicate a statistically significant interaction between cod-liver mycelium and antibiotic; cod-liver mycelium, rice bran and antibiotic or cod-liver mycelium fermentation product and antibiotic. Substitution of 4 percent fish meal for a protein equivalent of soybean meal did not improve the rate of gain appreciably.

In trial 2, substitution of pre-press solvent-processed cottonseed meal for 25 and 50 percent of the soybean meal in the basal diet resulted in no statistically significant differences from the basal

(over)

ABSTRACTER: Donald G. Snyder

6.14 INSECT REPELLANCY IN MULTIWALLS

Arnold, K. A.
Modern Packaging 28, 120-121, 194-196 (August 1955)

Due to insect infestation millions of dollars are lost annually through condemnation of food material by Federal Inspectors. Flour and cereal products are especially vulnerable to insects when shipped to hot humid areas where insects abound. The most common insects infesting cereals are the cadelle, saw-toothed grain beetle, flour beetle, and the lesser grain borer.

To combat the huge waste caused by these insects intensive tests have been under way by producers of multiwall flour containers. Of the two types of flour containers in general use, multiwall kraft bags and fabric bags, the former were found to be so much superior to fabric bags, even when untreated, that the tests with the various insecticides were confined to the multiwall kraft bags exclusively

Pyrenone has been found to be far more effective than other insecticides against flour infecting pests. Pyrenone is a combination of two insecticides and is made up in the proportion of 10 parts piperonyl butoxide to 1 part pyrethrin. This ratio was found to give the best results when used with a coverage of 50 milligrams per sq. ft. of piperonyl butoxide and 5 parts pyrethrin. Bags were tested by treating the outer ply and sleeve with a surface coating of the insecticide and also by impregnating the outer ply and sleeve. Bags were then filled with sterilized flour and sealed in the regular manner. Each bag was then stored in a metal-lined container having a tight-fitting cover. Storage period was for eight weeks at a temperature of 85° F. and 65 percent relative humidity. Before sealing the chests, a large number of flour pests such as cadelles, flour beetle, saw-toothed beetles were spread over the top of the bags.

(over)

ABSTRACTER: Lynne McKee

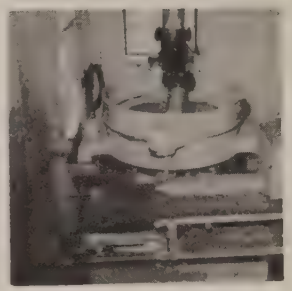
6.89 CHANGES SHRIMP WASTE INTO FERTILIZER ADDITIVE, BEATS POLLUTION PROBLEM

Anonymous
Food Processing 16, 32 (August 1955)

Members of a Westwego, Louisiana shrimp-processing plant have developed a method of handling shrimp waste so that it is a salable product instead of a waste disposal problem. The shrimp hulls and heads had formerly been discharged into a canal adjacent to the plant.

A vibrating screen separator was developed which discharges the shrimp waste onto a 24-inch wire belt conveyor. The conveyor takes the waste to a grinder. The ground product is sold as an additive for fertilizers.

A problem confronted by the engineers in setting up the operation was that of blinding the screen from the high velocity discharge. This was overcome by increasing the size of the discharge pipe from 3-inch diameter to 6-inch diameter and adjusting the eccentric relationships of weights controlling the vibratory action of the screen.



ABSTRACTER: Kathryn L. Osterhaug

EFFECT OF DRYING ON MEAL QUALITY

INSECT REPELLANCY IN BAGS

FISHERY BYPRODUCTS FOR SWINE

USE FOR SHRIMP WASTE

6.14

It was found that the bags having the outer ply and sleeve coated with pyrenone were completely resistant to all the insects. Practically all were dead showing that they were killed by contact with the bags. Multiwall bags having the outer ply and sleeve impregnated were not completely resistant to the insects.

After proving the feasibility of protection with pyrenone it was next necessary to show that the mixture was not dangerous to health. Samples of the treated bags were submitted to the Food and Drug Administration and permission was granted for the use of pyrenone in the treatment of flour containers.

Treatment of bags in this manner has been found to be effective for nine months at the most. Other insecticides, such as DDT, toxaphene, methoxychlor, chloradane, and lindane, are being tested with a view to lengthen the effective life of the treated bags. Lindane and methoxychlor show promise of being effective for a longer time but are not as toxic to the insects as the pyrenone.

6.89 (Cross Reference: 1.85)

6.134

6.190

ration alone. The addition of 3-percent condensed tuna fish solubles to the above rations resulted in a significant improvement in rate of gain. The increase in rate of gain was greater for pigs consuming rations containing the cottonseed meal than with those fed the soybean meal ration. Supplementation of the basal ration with 2-percent fermentation product improved rate of gain, but the increase was not statistically significant.

In trial 3, the cod-liver mycelium again produced a significant increase in rate of gain when added to the soybean meal basal ration. The addition of a water soluble or fat soluble fraction of cod-liver mycelium, however, failed to produce an increase in rate of gain. Likewise, the addition of the fermentation product or condensed tuna fish solubles did not significantly increase rate of gain.

7.0 HOW TO DESIGN EFFECTIVE EXPERIMENTS

Proschan, F. and Babcock, Jr., A. B. (Sylvania Electric Products, Inc. and The Borden Co., respectively)
Chemical Engineering 62, 191-198 (August 1955)

A popular misconception is that the best way to do an experiment is to keep all variables constant except one. This procedure guarantees nothing but inefficiency. One well-designed experiment taking into account all relevant factors is worth dozens or even hundreds of experiments that study one factor at a time.

Modern experimental design rests on a few basic principles: (1) Anticipate results: have a conclusion prepared for every possible experimental outcome; (2) Randomize: reduce bias and the effects of extraneous factors by randomization; (3) Increase accuracy: (a) use uniform units or techniques, (b) enlarge the experiment, and (c) plan treatments to reveal the interaction of the factors.

Anticipate results.--Before the experiment is performed, every experimental outcome should be anticipated, and a conclusion should be decided upon for each. Otherwise, the results are subject to misinterpretation. That is, it must be realized that every set of data will show some peculiarity or particular configuration. The point is that, to reach a definite conclusion, the experimenter must have a definite hypothesis before the experiment is started. He can then plan the experiment to permit the reliable acceptance or rejection of this hypothesis.

Randomize.--Extraneous factors present in every experiment tend to obscure the relationships being investigated. The authors give a table of random numbers, which can be used to minimize the risk of bias caused by extraneous factors and to insure that experimental inferences are validly

(over)

 ABSTRACTER: F. Bruce Sanford

7.80 "END POINT" KNOWLEDGE NEEDED, DIEHL SAYS

Anonymous
Quick Frozen Foods 64, 140 (October 1955)

The need for exact information on the "end points" of quality damage for the different kinds of frozen foods is one of the most critical research problems facing the industry today, H. C. Diehl told the annual meeting of The Refrigeration Research Foundation in Chicago, recently. Mr. Diehl was reelected secretary of the group at the meeting.

(Editor's Note: According to Eugene F. Jansen, head of the fruit-processing section, Western Utilization Research Branch in Albany, Calif., research work on time-temperature tolerance of frozen foods sometimes uses two different "end points" in connection with quality deterioration in the product. The two different "end points" used are: (1) first point of organoleptic quality change which can be detected by a trained taste panel, and (2) the second point at which further quality change would results in complaints by the consumer. The two "end points" for most commodities differ quite widely, according to Mr. Jansen.)

Pointing out that "end" points are closely related to quality of product, Mr. Diehl said the need for exact information has become more pressing with the increased complexity of frozen food products. Such information is also needed by governmental regulatory bodies.

Mr. Diehl said the Western Utilization Research Branch, Albany, Calif., has embarked on a project to determine quality "end point" knowledge for frozen foods.

(over)

 Reprinted in part

7.611 PARTITION CHROMATOGRAPHY OF VITAMIN-A ALCOHOL AND ITS APPLICATION TO THE NON-SAPONIFIABLE MATTER FROM COD-LIVER OIL

Dunckley, G. C. and MacFarlane, Yvonne J. (Nutrition Research Department, Medical School, Dunedin, New Zealand)
Journal of the Science of Food and Agriculture 6, 559-564 (September 1955)

Partition chromatograms using paraffin oil as stationary phase and various aliphatic alcohols as mobile phase were employed by the authors to separate vitamin A from some of the substances interfering with its spectrophotometric assay.

Introduction.--The spectrophotometric assay of vitamin A in fish oils is sometimes complicated by the presence of other compounds absorbing light at 325 millimicrons, the wavelength of maximum absorption. The separation of vitamin A from these interfering substances is usually effected by chromatography on an alumina column. Partition chromatography appears, however, to have advantages over the adsorption method, for reproducibility is improved, as standardized adsorbent is unnecessary and the volume of solvent required to elute the vitamin A is much smaller. A column once packed can be used a month or more without deterioration.

Distribution studies of vitamin A alcohol between hydrocarbon and aqueous alcoholic solvents have shown that the partition coefficient is greatly in favor of the hydrocarbon phase. The authors therefore found it appropriate to use reversed-phase columns in which paraffin oil is used as a stationary phase.

Materials.--Methanol, ethanol, and isopropanol (all transparent between 220 and 400 millimicrons) were used as solvents. The mobile phase was an alcohol-water mixture; the stationary phase was medicinal paraffin oil of specific gravity 0.885. Equilibration of the two phases was unnecessary, since the solubility of the paraffin oil in the aqueous alcohols used was negligible. Hyflo Supercel was (a) washed with water to remove large organic particles, (b) digested with hot concentrated hydrochloric acid, (c) washed free from acid with water, (d) dried, (e) heated to 500° C., (f) cooled,

(over)

 ABSTRACTER: F. Bruce Sanford

8.7 FEDERAL SPECIFICATIONS FOR FISHERY PRODUCTS

Piskur, F. T. (Fishery Technological Laboratory, East Boston, Massachusetts)
Commercial Fisheries Review 17, 9-10 (August 1955)

The Technological Section of the Fish and Wildlife Service is responsible for the development of Federal specifications for fishery products for use by other Federal Agencies. A specification is, by definition, an accurate description of the technical requirements for a material, a product, or service, including the procedure by which it will be determined that the requirements have been met.

The following specifications have been revised during the past several years:

PP-0-956, Oysters, raw, shucked (fresh or frozen), Issued July 27, 1950.

PP-C-401, Clams, raw, shucked; fresh (chilled) and frozen, Issued April 25, 1952.

PP-F-381, Fish; fresh (chilled) and frozen, Issued September 3, 1954.

PP-S-31, Salmon, canned, Issued February 3, 1954.

The following specifications have been revised and issued as Interim specifications:

PP-S-00311a, Shrimp, Canned, Interim specification issued November 18, 1954.

PP-S-00316a, Shrimp, raw and cooked, chilled and frozen, Interim specification issued November 18, 1954.

PP-C-00656a, Crab Meat, cooked; chilled and frozen, Interim specification issued May 2, 1955.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

EXPERIMENTAL DESIGN

VITAMIN A CHROMATOGRAPHY

FROZEN FOOD QUALITY CONTROL

SPECIFICATIONS FOR FISH

7.611

(g) washed with distilled water, and (h) dried at 110° C.

Procedure.--Six grams of silane-treated kieselguhr were used for a column 15 millimeters in diameter and 6 centimeters high. Before being used, the columns were washed with 90-percent aqueous methanol. The solvents were run down the columns at 10 to 20 milliliters per hour under nitrogen at a pressure of 10 centimeters of mercury.

The vitamins were dissolved in methanol for application to the column. The non-saponifiable material from cod-liver oils was prepared according to the British Pharmacopoeia (B. P.) method but was dissolved in 1 milliliter of methanol for application to the column. The product from 1 to 5 grams cod-liver oil could be applied without overloading the colum with vitamin A.)

The column was surrounded with a jacket through which water from a thermostatically controlled bath was circulated. An automatic fraction collector, which was covered to exclude light, was used to collect the eluate in 2.8-milliliter fractions. The light absorption of the fractions was measured at 265 and 325 millimicrons in 1-centimeter cells in a Beckman model DU spectrophotometer.

Results.--In studies with vitamin A alcohol in which various aqueous alcohols were used as the mobile phase, the authors found that the effect of diluting the alcohols with water was to spread the bands more widely. The effect of using a higher homolog was to increase the amount of water required to elute the vitamin. Higher alcohols, such as butanol, tended to strip the stationary phase from kieselguhr, even after two phases had been equilibrated. Elevation of the ambient temperature also caused instability of the stationary phase, except with low alcohol concentrations.

In studies on B. P. cod-liver oils, the authors determined the potencies of the oils by the B. P. spectrophotometric method and compared the results thus obtained with the recoveries of vitamin A from the column. In calculating these recoveries, the authors applied the Cama, Collins, and Morton correction for irrelevant absorption. The results are given in the accompanying table.

	Vitamin A content of cod-liver oils	
	Determined by B. P. method.	Recovered from chromatogram.
	i. u./g.	i. u./g.
B. P. cod-liver oil	790	753
B. P. cod-liver oil	790	740
8-year-old B. P. cod-liver oil	---	70

8.7

The following specifications have been revised and are out for review by the industry:

PP-C-651, (Revision "a" Crab Meat; Canned, Revised June 9, 1955.

PP-S-51, Sardines, Canned (Revised July 1955 for preliminary industry review and coordination with other Federal agencies).

The following specifications have been cancelled:

PP-F-371, Fish; Flaked, Canned, March 31, 1931.

PP-F-401, Fish; Salted or Smoked, March 31, 1931.

The following specification is being revised:

PP-O-951, Oysters, Canned, Issued March 3, 1931.

No action has been taken on the specifications for Tuna Fish, Canned, PP-T-771, March 31, 1931, pending development of standards of identity and fill by the Department of Health, Education, and Welfare.

(Single copies of Federal fishery specifications and other product specifications required by activities outside the Federal government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D. C.)

7.0

derived. By use of the table of random numbers, randomization can be applied to such factors as the scheduling of test runs, the selecting of raw materials from large lots, the positioning of samples in test ovens, the assigning of operators to test equipment, and the determining of the order of running trials.

Increase accuracy.--An experimental effect is often mistakenly attributed to the factor under study, whereas it may result from other factors or their interaction. Also, the effect of the studied factor may be obscured by a lack of uniformity in the experimental units or by variations in technique.

One way to increase experimental accuracy is to refine the experimental procedure by checking the uniformity of test methods or units and by taking pains to insure that the treatments, methods, and materials being compared are applied uniformly.

A second way of increasing experimental accuracy is to increase the size of the experiment. That is, an unbiased estimate based on n units would tend to be one-half as close to the true value as an estimate based on 4n units.

A third way of increasing experimental accuracy is to plan the experiment to reveal the interaction of the factors. In many experiments the factors do not act independently. For example, in a study of the effect of pH and temperature on the yield of a precipitant, it was suspected that the temperature effect depends upon the pH. An experiment keeping one variable constant in the classical tradition would make it difficult to determine the influence of pH. Furthermore, the experiments would have to run many more trials than would be required under modern factorial design to achieve the same precision.

After discussing the foregoing fundamentals of experimental design, the authors explore three specific design methods that have wide application. These are the following:

1. Completely randomized design for homogeneous material.
2. Randomized blocks with non-uniform experimental units.
3. Factorial design to study the interaction of factors.

7.80

Reporting on current TRRF projects, Mr. Diehl noted that packaging and its behavior under low temperature conditions have received more interest recently. Two such packaging problems that are the subject of inter-industry research at present are the collection of damaging moisture upon removal of frozen foods from low-temperature storage to room temperature and the relationship between package-failure problems in warehouses and the atmospheres within packages.

0.30 THE SMELL AND ODOR OF MARINE PRODUCTS

Obata, Yataro
J. Japan. Soc. Food Nutrition 5, 115-120 (1952-53)
Chemical Abstracts 48, 5238 (1954)

A review on the chem. nature of the smell and odor of fish, fish products, marine animal oils, and seaweeds with 33 references.

0.6 RESEARCH ON FOOD PRESERVATION IN THE UNITED KINGDOM

Department of Scientific & Industrial Research, Food Investigation Organization, London (January 1954)

This reference contains information about the official and semi-official organizations in the United Kingdom that do research on food, their organization and scope of work.

0.7 UTILIZATION OF PROTEINS

Berg, Clarence P
Journal of Agricultural and Food Chemistry 3, 575 (July 1955)

0.8 SELECTING AND USING "FREON" REFRIGERANTS

Barnard, W R.
Industrial Refrigeration 128, 43 (May 1955)

1.017 DINOFLAGELLATES IN THE AUSTRALIAN REGION

Wood, E. J. F
Australian Journal of Marine and Freshwater Research 5, 171 (May 1954)

1.4 HOW HIGH CAN PERCH CLIMB?

Alverson, Dayton L.
Pacific Fisherman 52, 25 (October 1954)

1.4 DETERMINATION OF COOK DRIP IN PACIFIC OCEAN PERCH (SEBASTODES ALUTUS) AND BY PACIFIC OYSTERS (OSTREA GIGAS) BY USE OF A NEW METHOD

Sumerwell, Wm. N.
Commercial Fisheries Review 17, 18-21 (March 1955)

(Abstract of this article appears under 3.249 page 17 - August 1955 issue)

1.88 THE PEARLY FRESHWATER MUSSELS OF ONTARIO

Detweiler, John D. (St. Andrew's College, Toronto)
Contributions to Canadian Biology (Supplement to the 7th Annual Report of the Department of the Naval Service, Fisheries Branch) 75-91 (1918)

1.88 A STUDY OF THE SEA MUSSEL (MYTILUS EDULIS LINN.)

Mossop, Bessie K. E. (University of Toronto)
Contributions to Canadian Biology, No. 1 and 2 (1921)

Five problems were studied: (1) the distribution of the beds and the size and number of mussels in them, (2) the age of the animals forming the beds, (3) the enemies which prey on them, (4) the factors governing their rate of growth, and (5) the factors governing their distribution.

1.89 GUANIDINO COMPOUNDS OF SPONGES

Garcia, Isabelle and Miranda, Francois
Compt. rend. soc. biol. 148, 1187-1188 (1954)
Chemical Abstracts 49, 3421 (1955)

Exts. of freshly collected Halichondria panicea, Hymeniacidon caruncula, and Thetia lyncurium were examd. by chromatographic methods. All 3 sponges contained arginine (very little), creatine, agmatine, and glycocyamine, and T. lyncurium contained an addnl. unidentified Sakaguchi-pos. compd.

2.06 SIZE REDUCTION -- KEY TO PROCESS INNOVATION

Kovac, George M.
Food Engineering 26, 73-80 (December 1954)

(Abstract of this article appears under 0.12 page 13 - March 1955)

2.06 PROCESSING OF FISH

Fraticelli, Pasquale
U.S. patent 2,687,356 (Aug. 24, 1954)
Chemical Abstracts 48, 14039 (1954)

"Tuna, bonito, or yellow tail meat is ground or chopped and mixed with a curing compn. consisting of $NaNO_2$ 0.25, $NaNO_3$ and (or) KNO_3 2, NaCl 20, and glutamic acid 4 oz./100 lb. of fish The mixt. is seasoned with mace 1, white pepper, 4, monosodium glutamate 2, and coriander 2 oz. The cured, seasoned, and ground fish is mixed with 3 oz. milk solids, 2 1/2 lbs. of soybean or wheat flour, and 10-15 percent by wt. of hydrogenated shortening, stuffed into sausage skins, and smoked."

2.5 THE AEROPLANE AS A FISH CARRIER

Hardy, M. J.
World Fishing 2, 287 (July 1953)

2.8 CRAWFISH TODAY

Kane, Harnett T.
Gourmet 15, 11 (April 1955)

2.8 BROWNING METHODS IN MICROWAVE COOKING

Copson, David A., Neumann, Barbara R., and Broday, Aaron L.
Journal of Agricultural and Food Chemistry 3, 424 (May 1955)

2.9 TETRODOTOXIN

Kawamura, Masaaki
Ann Rept. Takamine Lab 4, 49-54 (1952)
Chemical Abstracts 49, 3474 (1955)

2.9 NUTRITIVE VALUE OF THE PALOLO

Miller, Carey D.; Pen, Florence; and Gatty, Harold
Federation Proceedings 14, 445 (March 1955)

(Abstract of this article appears under 1.9 page 5 - December 1955 issue)

3 23 HOW TO MAKE UP CONTROL CHARTS FOR AUTOMATIC SCALES

Rudd, John K.
Feedstuffs 27, 10-11, 43 (January 1, 1955)

(Abstract of this article appears under 6.130 page 19 - April 1955 issue)

3 234 THE FREEZING OF HERRING

Van den Broek, C. J. H.
Visserijw. 11, No. 1, 5-6 and No. 2, 5-6 (1952)
Food Science Abstracts 27, 23 (January 1955)

If herring are to be frozen and used for canning 4 to 6 months later, only fish from the last catch of a fishing trip will be of acceptable quality. The catch must be iced immediately on board. Small concentrations of salt added to the iced herring improved the quality of the poorest fish but lowered that of the freshest

3.234 WIDENING HORIZONS OF FOOD RESEARCH

Anonymous
Food Manufacture 30, 198-199 (May 1955)

(Abstract of this article appears under 2.00 page 3 - December 1955 issue)

3.235 COOLING PRACTICES AND MICROCOCCI GROWTH

Miller, W. A. and Smell, Mary L.
Journal of the American Dietetic Association 31, 469-473 (May 1955)

(Abstract of this article appears under 2.05 page 7 - September 1955 issue)

3.24 TECHNIQUES OF FREEZING AND STORING FISH AND SEAFOOD. PART II

Butler, Charles
Frosted Food Field 20, 20-22 (April 1955)

(Abstract of this article appears under 2.15 page 7 - September 1955 issue)

3.26 OUTLINES OF A LONG-RANGE FROZEN FISH PROGRAM FOR THE ARMED FORCES

Peterson, Stanley R.
Commercial Fisheries Review 17, 1-7 (January 1955)

(Abstract of this article appears under 8.8 page 7 - July 1955 issue)

3.26 MECHANICAL REFRIGERATION FOR RAILROAD REFRIGERATOR CARS

Henney, C. F. and McCoy, D. C.
Refrigerating Engineering 62, 41 (October 1954)

Now past the experimental stage, refrigeration equipment design is being refined and perfected for its task of protecting perishables.

3.30 MAKE THE LABEL AND IMAGINARY WINDOW

Shurpit, Jo Ann
Canner 120, 16 (May 30, 1955)

3.30 BRITISH COLUMBIA'S SALMON CANNING INDUSTRY

Dewberry, E. B.
Food 23, 250-255 (1954)
Food Science Abstracts 27, 134 (March 1955)

3.338 DISCOLORATION OF CANNED FISH BALLS

Vesterhus, Rolv
Tids. Hermetikind. 35, 219-230 (1949)
Chemical Abstracts 43, 8069 (1949)

Discoloration may arise from the following reasons: inadequate washing of the fish, over-processing of the product, or sulfide-blackening from the containers. Small amts. of Cu from the steam pipes may be an addnl. reason for discoloration.

3.338 METAL CONTAINERS FOR FOOD

Huntley, J. G.
Chemistry and Industry, No. 47, 1434 (November 20, 1954)

3.4 THE MICROBIOLOGY OF CURED AND FROZEN FISH

Shewan, J. M.
Symposium on cured and frozen fish technology, Swedish Institute for Food Preservation Research, Göteborg, No. 100, Chapter 2, pp 1-18 (November 1953)

(Abstract of this article appears under 0.5 page 1 - December 1955 issue)

3.6 A METHOD FOR THE PREPARATION OF FISH POWDER

Salomon, A.
Conserva 2, 371-372 (1954)
Food Science Abstracts 27, 133 (March 1955)

In this method, the fish is reduced to a brei and this is roller-dried to produce a powder. It is claimed that no constituents of the fish are lost, and fish powder is therefore a feed of better quality than ordinary fish meal, and contains 8 percent more protein.

4.0 QUALITY OF WHALE OIL. I - XVII

Various authors
Repts. Japan. Marine Products Co. Research Lab., No. 5, 19-49 (1952); No. 6, 47-83 (1954)
Chemical Abstracts 48, 14254 (1954)

4.21 STUDIES ON A KIND OF DISCOLORATION OF FISH-OIL VIII & IX

Nonaka, Junsaku; Ando, Kazuo; and Komatsu, Masaru
Bulletin of the Japanese Society of Scientific Fisheries 20, 40 (1954) (English summary, figure, and tables)

These experiments suggest that oxidized acid in general does not contain nitrogen as its molecular constituent. It seems likely that the ammonia partaking in the discoloration of autoxidized fish oil behaves merely as a catalyst. The substance in autoxidized oil that corresponds to the precursor of oxidized acid is the substance capable of forming the skeletal portion in the network of Linoxyn gel.

4.22 HYDROGENATION OF FATTY OILS. VI. HYDROGENATED PRODUCT OF HIGHLY POLYMERIZED SARDINE OIL

Tsuchiya, Tomataro and Kato, Akio (Govt. Chem. Ind. Research Inst., Tokyo)
Repts. Govt. Chem Ind. Research Inst., Tokyo 45, 32-34 (1950), cf. C A. 44, 1721i
Chemical Abstracts 46, 2239 (March 10, 1952)

4 23 MANUFACTURE OF ESTERS FROM SPERM OIL

British patent 704,706 (February 24, 1954)
Chemical Abstracts 48, 12431 (1954)

Neutral unsat. fatty alc.-fatty acid esters are obtained from sperm oil by splitting the glycerides under the influence of water at a temp. below 250° in a pressure autoclave and in the absence of fat-splitting agents. The neutral oil fraction contg. the esters of hexadecyl and oleyl alcs. can be isolated from the autoclaved mixt. after removal of the glycerol-water phase and extn. of the free fatty acids with MeOH

6.0 ROAD TO HIGH PROFITS

Anonymous
Chemical Week 74, 20-22 (May 1, 1954)

(Abstract of this article appears under 6.4 page 11 - July 1954 issue)

6.130 "POGY" PLUNDER

Washburn, Mel
Louisiana Conservationist 2, 13-17 (1949)
Chemical Abstracts 44, 4696 (1950)

Description of menhaden oil plant and operations at Cameron, La.

6.130 WIDENING HORIZONS OF FOOD RESEARCH

Anonymous
Food Manufacture 30, 198-199 (May 1955)

(Abstract of this article appears under 2.00 page 3 - December 1955 issue)

6.52 STUDIES OF THE MECHANISM OF VITAMIN E ACTION. III. IN VITRO COPOLYMERIZATION OF OXIDIZED FATS WITH PROTEIN

Tappel, A. L.
Archives of Biochemistry & Biophysics 54, 266 (February 1955)

(Abstract of this article appears under 0.33 page 1 - June 1955 issue)

6.59 VITAMIN CONTENT OF FISHERY BYPRODUCTS. PART 2. VITAMIN B_{12} IN PACIFIC SARDINE (SARDINOPS CAERULEA) ORGANS AND RIBOFLAVIN, NICOTINIC ACID AND VITAMIN B_{12} IN ALBACORE TUNA (GERMO ALALUNGA) ORGANS

Karrick, Neva L.
Commercial Fisheries Review 17 8-11 (February 1955)

(Abstract of this article appears under 8.64 page 7 -- July 1955 issue)

6 71 PRODUCT USED FOR THE MACERATION OF HITEDS OBTAINED BY THE UTILIZATION OF THE ENZYMES OF THE ENTRAILS OF FISH

Boccaido, Sebastinao
Italian patent, 422,145 (June 11, 1947)
Chemical Abstracts 43, 4881 (1949)

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemistry and Industry
Commercial Fisheries Review
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fisherman
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
Food Technology
Frosted Food Field
Industrial and Engineering Chemistry
Industrial Refrigeration
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Meldinger Fra SSF (Herring Industry, Norway)
Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

7.4 NATURAL LEVELS OF SOME MICROELEMENTS IN FISH OF BARENTS SEA

Adamova, A. A.; Bosin, A. G.; Noskoboinikova, M. I.; and Tverdysheva, O. I.
Gigiena i Sanit. No. 11, 34-38 (1949)
Chemical Abstracts 44, 1618 (1950)

The concns. of Pb, Cu, Zn, Sn, As, and I in a variety of the common fish are given in tabular form with av., min., and max. values found. No regular seasonal variation could be found.

7.41 THE PREPARATION OF BIOLOGICAL MATERIAL FOR THE DETERMINATION OF TRACE METALS. PART II. A METHOD FOR THE DESTRUCTION OF ORGANIC MATTER IN BIOLOGICAL MATERIAL

Middleton, G. and Stuckey, R. E.
Analyst 79, 138-142 (March 1954)

Nitric acid is the only reagent used in quantity, and the mineral constituents are obtained in acid solution with but small quantities of other reagents. The maximum temperature attained does not exceed 350° C.

7.42 FLAME PHOTOMETRIC DETERMINATION OF STRONTIUM IN SEA WATER

Chow, Tsaihwa, J. and Thompson, Thomas G. (Department of Oceanography, University of Washington)
Analytical Chemistry 27, 1, 18 (January 1955)

7.42 NEW MODIFIED COLORIMETRIC METHOD OF DETERMINATION OF COPPER IN BIOLOGICAL MATERIALS WITH SODIUM DIETHYLDITHIO-CARBAMATE

Kimura, Kenjiro and Murakimi, Yukio (Tokyo University)
Mikrochemie ver Mikrochim Acta 36/37, 958-966 (1951)
Chemical Abstracts 45, 5748 (July 10, 1951)

7.43 A COMPARISON OF TWO METHODS FOR THE DETERMINATION OF MOISTURE CONTENT IN HEAT-PROCESSED BEEF

Bard, J. C.; Ostle, B.; and Tischer, R. G.
Iowa St. Coll. J. Sci. 26, 581-587 (1952)
Food Science Abstracts 25, 256 (May 1953)

7.43 THE FAT AND WATER CONTENT OF HERRING

Brandes, C. H.
Symposium on cured and frozen fish technology, Swedish Instititut e for Food Preservation Research, Göteborg, No. 100, Chapter 11, pp 1-11 (November 1953)

(Abstract of this article appears under 8.53 page 7 - October 1955 issue)

7.44 PRECISION DETERMINATION OF NITROGEN IN ORGANIC COMPOUNDS IMPROVED TECHNIQUE OF DISTILLATION

Pozzi-Escot, E.
Actas y trabajos congr. peruano quim., 3° congr. (Lima, Peru) 2, 457 (1949)
Chemical Abstracts 45, 5567 (July 10, 1951)

7.44 A NEW SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF NITRITE IN SEA WATER

Bendschneider, Kenneth and Robinson, Rex J.
J. Marine Research 11, 87-96 (1952)
Chemical Abstracts 47, 2641 (1953)

7.45 TOXICOLOGY OF ARSENIC. DETERMINATION IN CRUSTACEAE AND MOLLUSKS

Kohn-Abrest, E.
Ann. fals. et fraudes 44, 13-16 (1951)
Chemical Abstracts 45, 9186 (October 25, 1951)

7.599 THE ASSAY METHOD OF PFUFFER POISON

Hashimoto, Yoshiro and Migita, Masao
Bull. J. S.S.F. 16, 431-436 (1951)
Chemical Abstracts 47, 8318 (1953)

The dose-effect curve of the pfuffer poison is very similar to that of paralytic shellfish poison (Sommer and Meyer, C.A. 32, 2623), and an assay method has been presented based on that of S. and M.

7.610 VITAMIN A FACTORS OF OIL OF PENAEIDAE CRUSTACENAS

Granguad, R.; Chechan, C.; Massonet, Renee; and Odier M.
Bull. soc. chim. biol. 32, 248-249 (1950)
Chemical Abstracts 44, 10266 (1950)

7.610 COMPARISON OF PHYSICAL AND CHEMICAL METHODS WITH BIOLOGICAL ASSAY OF VITAMIN A

Murray, T. K. and Campbell, J. A.
J. Pharm. and Pharmacol. 5, 596-607 (1953)
Chemical Abstracts 47, 12480 (1953)

INDEX

Subject	Page No.	Card No.
Analysis, general		
Experimental design	19	7.0
Analysis, inorganic		
Microelements in Barents Sea fish	27	7.4
Ashing in trace-metal studies	27	7.41
Determination of copper	27	7.42
Determination of strontium in sea water	27	7.42
Determination of nitrite in sea water	27	7.44
Determination of arsenic	27	7.45
Analysis, moisture		
Determination of moisture	27	7.43
Determination of nitrogen	27	7.44
Assay for pfuffer poison	27	7.599
Analysis, vitamins, vitamin A		
Vitamin A factors	27	7.610
Vitamin A assay methods	27	7.610
Vitamin A chromatography	19	7.611
Analysis of vitamin A in margarine	29	7.611
Vitamin A analysis in oleomargarine	29	7.6132
Antimony trichloride pigment	29	7.6132
Purification of kitol	29	7.6139
Analysis, vitamins, B-complex vitamins		
Polarographic assay of riboflavin	29	7.63
Chemical assay of vitamin B_6	29	7.64
Determination of riboflavin	29	7.64
Analysis, vitamins, miscellaneous		
Determination of vitamin E	29	7.67
Vitamin E analysis	29	7.67
Analysis and composition, specifications and oil constants		
Specifications for fish	19	8.7
Oil analysis	29	7.777
Australian and New Zealand fisheries		
Dinoflagellates in Australian region	21	1.017
Byproducts, miscellaneous		
Use for shrimp waste	17	6.89
Fish-enzymes tanning agent	25	6.71
Canned fish, general		
Committee on canned foods	11	3.30
Salmon canning in B. C.	23	3.30
Labeling canned foods	23	3.30
Canned fish, containers		
Metal containers for food	23	3.338
Discoloration of canned fish balls	23	3.338
Canned fish, processing		
Retort controls for canning	11	3.33
Chemistry and biochemistry, miscellaneous		
Histamine formation mechanism	1	0.32
Chemistry of fish odors	21	0.30
Cookery		
Crawfish cookery	21	2.8
Microwave cooking	23	2.8
Dried and dehydrated fish		
Freeze-dried meat and fish	13	3.60
Preparation of a fish powder	25	3.6
Economics and statistics		
Economics of fishing	7	2.6
Fish meal, nutritive value		
Fishery byproducts for swine	17	6.190
Fish meal and oil, manufacture		
Review of marine oil literature	13	4.00
Small-scale fish meal production	15	6.132
New fish meal process	15	6.132
Effect of drying on meal quality	17	6.134
Insect repellancy in bags	17	6.14
Menhaden reduction plant	25	6.130
Food technology		
Food research organizations	21	0.6
"Freon" refrigerants	21	0.8

Subject	Page No.	Card No.
Freshness of fish		
Frozen food quality control	19	7.80
Measures of consumer preference	29	7.80
Buffering capacity vs. freshness	29	7.84
Frozen fish, changes in during freezing and cold storage		
Oxidative rancidity in meat	13	3.249
Frozen fish, packaging		
Packaging with plastic wax	9	3.238
Frozen food containers	9	3.238
Frozen fish, processing		
Portion control pack	7	3.236
Quality control for frying oils	9	3.237
Freezing herring for canning	23	3.234
Gear, fishing		
Snag-line fishing	3	2.1123
TV trawl observations	3	2.1121
Handling fresh fish		
Bacteriology of fillets	3	2.01
Bruised plaice flesh	5	2.15
Sanitation of fish holds	5	2.15
Screens for fish pen walls	5	2.15
Marketing		
Fish promotion	7	2.6
New products		
Smoked fish sausages	21	2.06
Nutrition and medicine, general		
Utilization of proteins	21	0.7
Nutritional value of fish and toxicity		
Histamine formation mechanism	1	0.32
Globefish poison	23	2.9
Oils, chemical and physical properties		
Quality of whale oil	25	4.0
Discoloration of fish oil	25	4.21
Hydrogenation of fatty oils	25	4.22
Esters from sperm oil	25	4.23
Oils, utilization and marketing		
Soap from seal oil	15	4.89
Oysters		
Shellfish sanitation	1	1.81
Preserved fish, miscellaneous		
Bacteria from herring preserves	13	0.5
Preservatives and sanitation		
Bacteriology of fillets	3	2.01
Bactericidal ice	7	3.17
Plant sanitation	9	3.18
Rockfish and rosefish		
How high can perch climb?	21	1.4
Shellfish and crustaceans, miscellaneous		
Pearly fresh-water mussels of Ontario	21	1.88
Sea mussel (Mytilus edulis)	21	1.88
Composition of sponges	21	1.89
Shrimp		
Peeled and deveined shrimp	1	1.85
Smoked fish		
Smoked eels	11	3.4
Mold inhibitor for smoked fish	11	3.4
Spoilage		
Myxosporidia in fish	1	0.5
Trimethylamine in iced flounder	3	2.01
Bacteriology of fillets	3	2.01
Bacteria from herring preserves	13	3.8
Transportation		
Air transport of fish	21	2.5
Railroad refrigerator cars	23	3.26
Vitamins, vitamin B_{12} and protein utilization factor (s)		
Structure of vitamin B_{12}	15	5.41
Vessels, fishing		
Variable pitch propellers	3	2.114

7.611 A MODIFIED METHOD FOR THE SPECTROPHOTOMETRIC DETERMINATION OF VITAMIN A IN MARGARINE

Lord, J. W. and Bradley, P. M.
Analyst 80, 429-438 (June 1955)

In principle, the modified method is similar to the Official method, but does not require specially activated adsorbents. Commercially available de-fatted bone meal of appropriate particle size is the selected adsorbent. Experiments on margarine show that it is possible to recover from the column a fraction giving spectral absorption substantially the same as that of pure vitamin A. After a correction for slight irrelevant absorption, recovery of vitamin A is near 100 percent compared with about 107 percent by the Official method. Results on commercial margarines by the Official and modified methods are for practical purposes in good agreement.

7.6132 DETERMINATION OF VITAMIN A IN VITAMINIZED VEGETABLE OLEOMARGARINES

Lodi, Mario
Intern. Z. Vitaminforsch. 21, 17-26 (1949)
Chemical Abstracts 44, 769 (1950)

7.6132 THE NATURE OF THE BLUE PIGMENT OF THE CARR-PRICE REACTION FOR VITAMIN A

Giral, Jose
Mem. congr. cient. mex., IV, Centenario Univ. Mex. 2, 212-224 (1953)
Chemical Abstracts 49, 1860 (1955)

7.6139 KITOL. IV. PURIFICATION OF KITOL BY CHROMATOGRAPHY

Tawara, Tadashi and Fukazawa, Ryusuke
Bull. Japan. Soc. Sci. Fish. 16, 375-376 (1951)
Chemical Abstracts 47, 12483 (1953)

7.63 POLAROGRAPHIC DETERMINATION OF RIBOFLAVIN IN HEPATIC EXTRACTS

Portillo, R. and Varela, G.
Anales real acad. farm. 15, 787-792 (1949)
Chemical Abstracts 44, 10782 (1950)

7.64 CHEMICAL ASSAY OF VITAMIN B_6. II. ESTIMATION OF VITAMIN B_6 IN ANIMAL AND PLANT TISSUES THROUGH THE DIAZO REACTION

Ryû, Heikon (The Kitasato Inst., Tokyo)
Igatu to Seibut sugaku (Med. & Biol.) 17, 196-199 (1950)
Chemical Abstracts 45, 1189 (February 10, 1951)

7.64 DETERMINATION OF RIBOFLAVIN ACCORDING TO THE LUMIFLAVIN METHOD

Jansen, A. P. (Netherlands Inst. Nutrition, Amsterdam)
Rec. trav. chim. 69, 1275-1280 (1950) (In English)
Chemical Abstracts 45, 2052 (March 10, 1951)

7.642 STATUS OF UNIDENTIFIED VITAMINS

Norris, L. C.
Feedstuffs 27, 22-24 (February 5, 1955)

(Abstract of this article appears under 6.193 page 13 - May 1955 issue)

7.67 CHEMICAL DETERMINATION OF VITAMIN E

Dunford, R. A. (Brit. Drug Houses (Canada) Ltd., Toronto)
Can. Chem. Process Ind 35 47-49, 57 (1951)
Chemical Abstracts 45, 2530 (March 25, 1951)

7.67 VITAMIN E ANALYTICAL PROCEDURE FOR COTTONSEED AND ITS PRODUCTS

Deacon, Benjamin D. and Wamble, A. Cecil
Journal of the American Oil Chemists' Society 31, 284-287 (July 1954)

7.777 READS IODINE NUMBER DIRECTLY

Anonymous
Food Processing 16, 66 (April 1955)

7.777 SOME OBSERVATIONS ON EXTRACTION AND IODINE VALUES OF FAT FROM FISH TISSUE, PRESS CAKE AND MEAL, AND ON PEROXIDE VALUES OF MEAL FAT THE FIRST DAY

Olafsson, Pall
Timarit Verkfraeoingafelags Islands 38, No. 4 (1953)

(Abstract of this article appears under 6.14 page 9 - November 1954 issue)

7.80 COMPARATIVE SENSITIVITY OF RATING SCALE AND PAIRED COMPARISON METHODS FOR MEASURING CONSUMER PREFERENCE

Pilgrim, Francis J. and Wood, Kenneth R.
Food Technology 9, 385 (August 1955)

The scale rating and paired preference methods were compared for relative sensitivity in determining differences in consumer preference. The subjects were untrained observers and the conditions were limited to those under which the paired comparison method can be used. The rating scale and paired preference methods were shown to be equally sensitive whether the difference in preference was small or large.

7.84 THE BUFFERING CAPACITY OF FISH FLESH TOWARDS HYDROCHLORIC ACID AS A MEASURE FOR ITS FRESHNESS

Hacker, Ruth
Z. Lebensm.-Untersuch. u.-Forsch. 90, 361-367 (1950)
Chemical Abstracts 44, 8555 (1950)

INT.-CUP. SEC., WASH., D.C. 92465

United States
tment of the Interior
and Wildlife Service
shington 25, D. C.

Official Business